# World Petroleum

**OCTOBER**
**1949**

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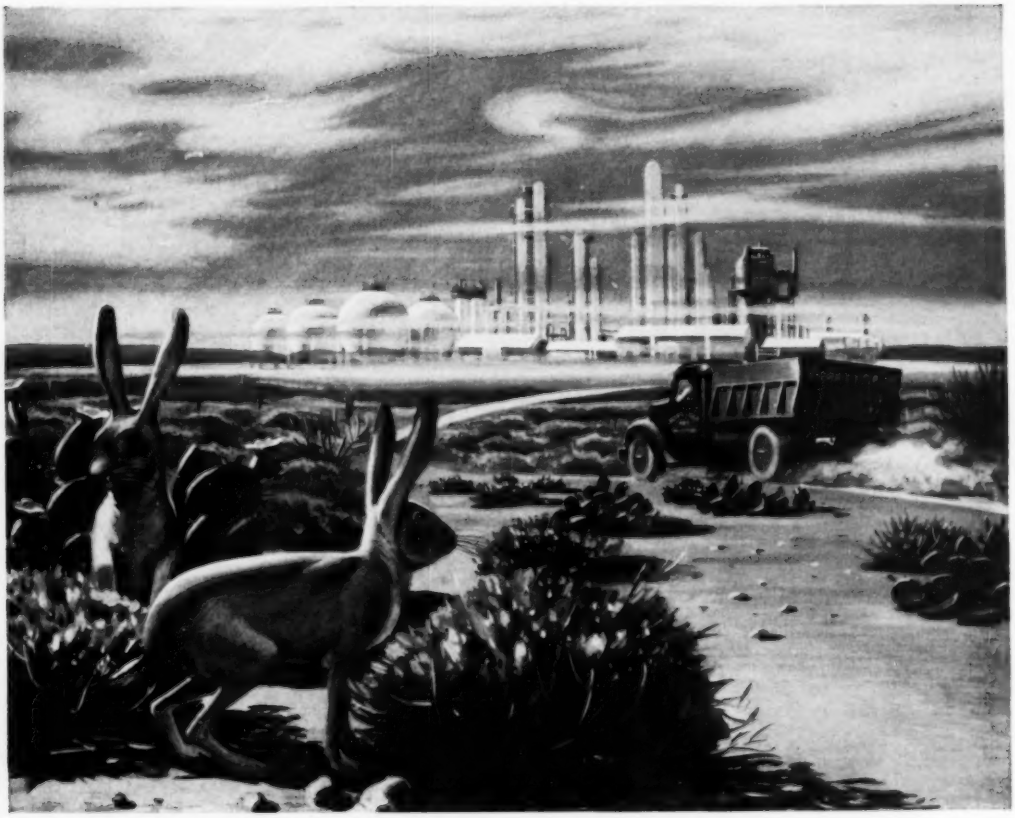

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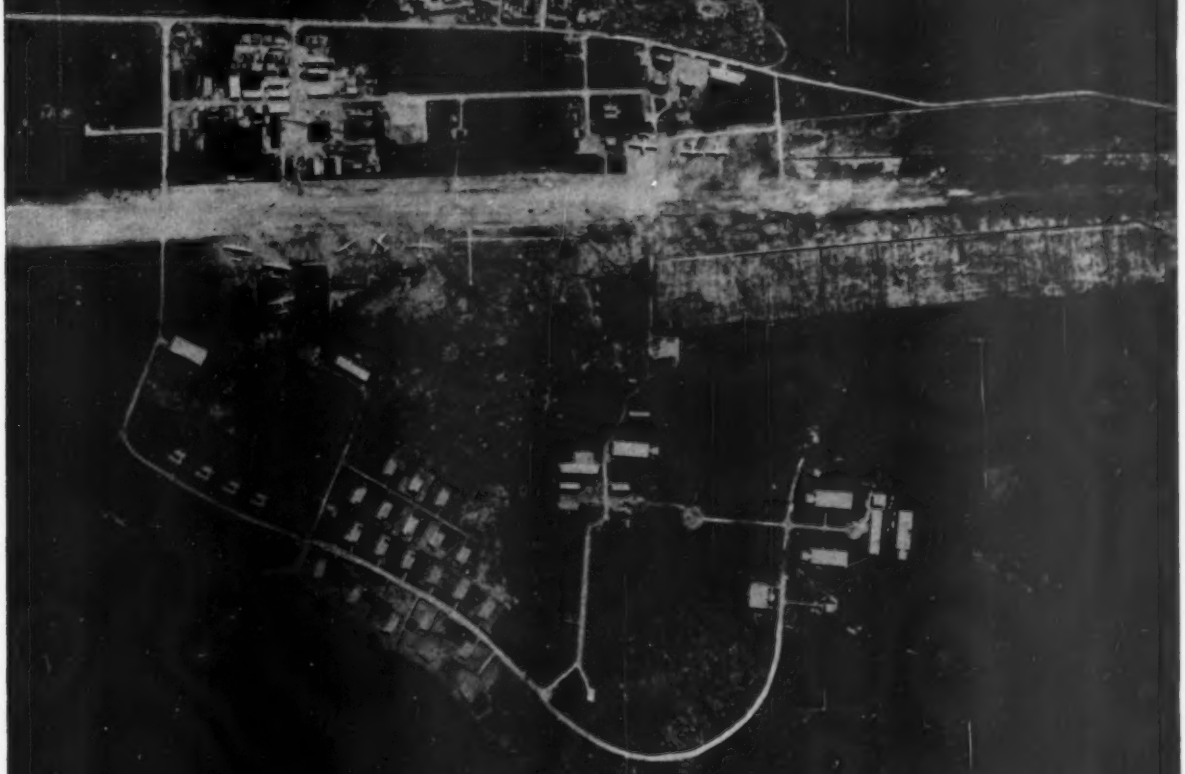

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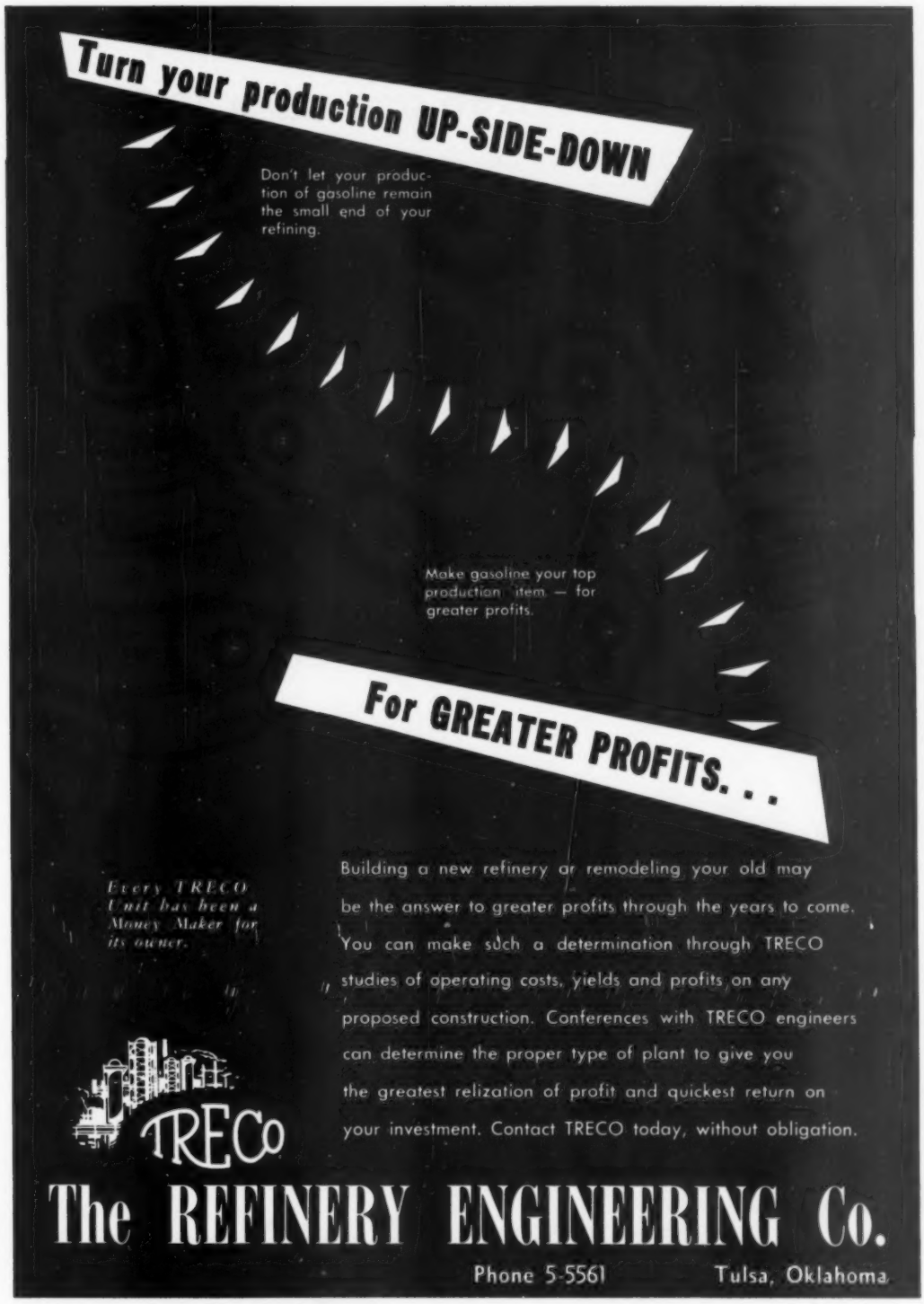
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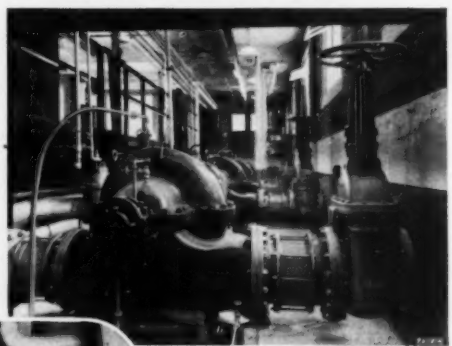
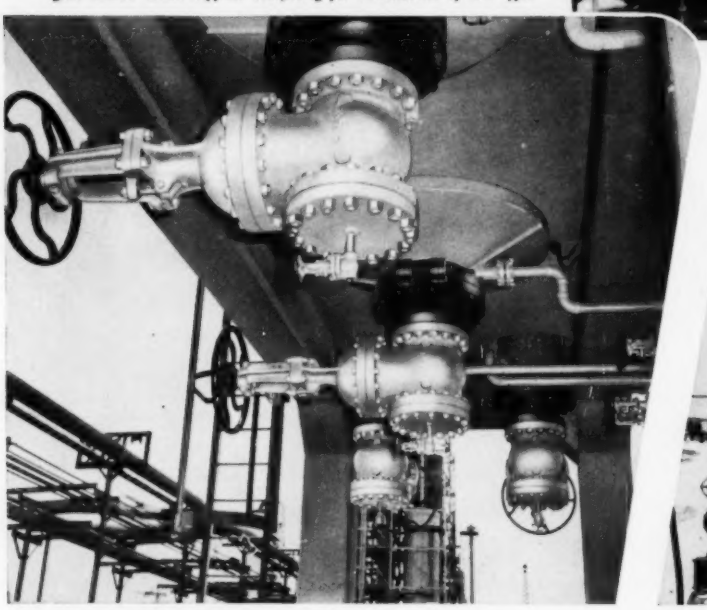
**WATER LINES** *in refinery pump room using Crane 150-pound W.O.G. iron body double disc gate valves.*





**BAUXITE FILTERS** *in HF alkylation unit featuring Crane 300-pound steel gate valves. Crane supplies everything for installations of this type.*

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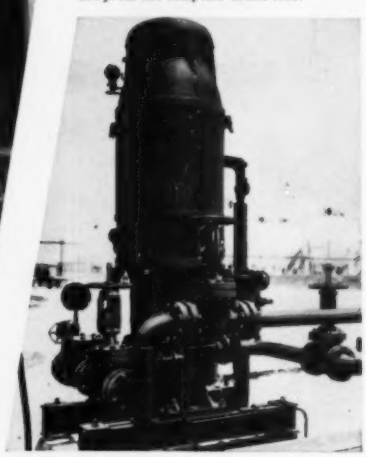

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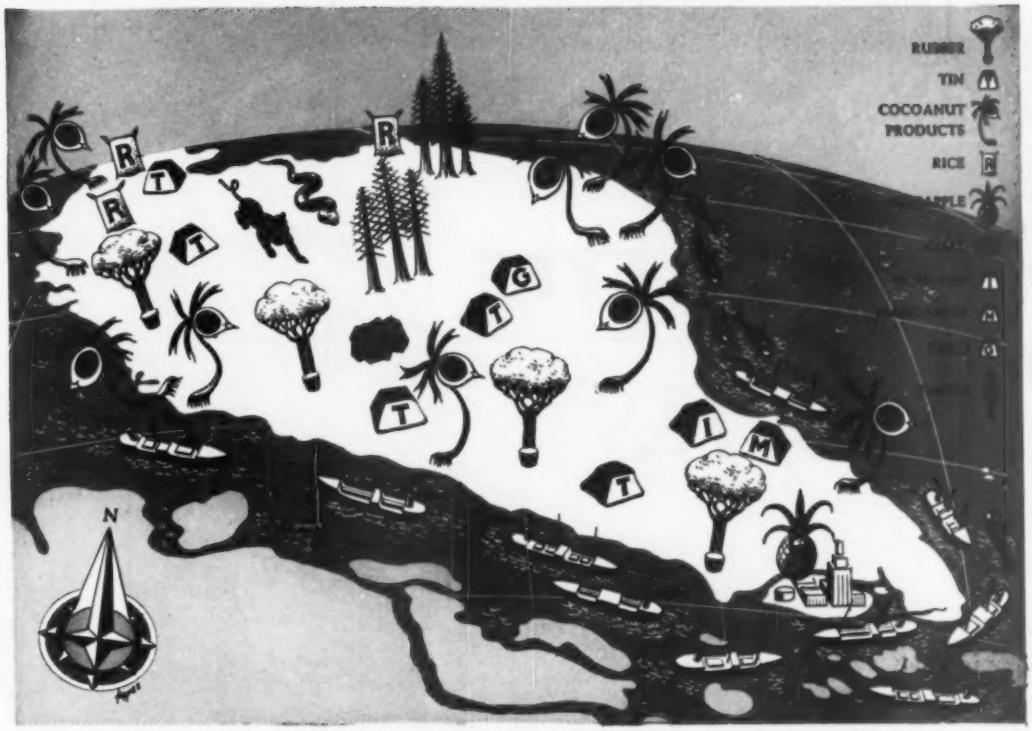
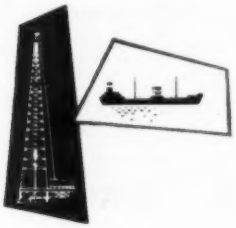



# MALAYA

MALAYA . . . The tropical Malay peninsula and adjacent islands, comprising The Colony of Singapore and The Federation of Malaya, is amazingly colorful, enchanting, and productive. Its green jungle-clad mountains, rubber plantations and rich alluvial plains provide a large share of the world's rubber and tin; its natural wealth includes cocoanut products, rice, pineapple, timber, coal, iron ore, manganese and gold; its surrounding blue seas abound with fish. Living in friendly harmony with the hospitable Malays in this equatorial clime are Chinese, Indians, Burmese, Siamese, Indonesians and Occidentals from many countries.

SINGAPORE, the focal point of the verdant peninsula, with its teeming harbor rated among the world's ten most important, is truly the "Crossroads of the East." Through this great clearing house of Southeast Asia flows commerce in endless variety.

STANDARD-VACUUM is proud of the part it plays in supplying Malaya with the petroleum products so essential to its welfare and continued growth.



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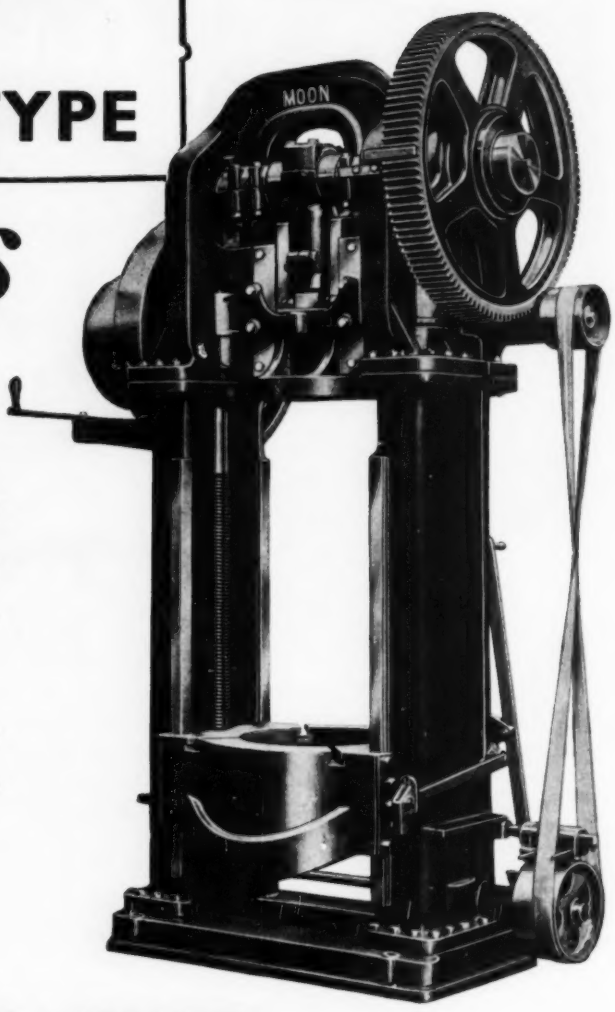
# CURLING PRESS

## *for* OPEN TYPE *Drums*




This is a machine designed primarily for curling the open tops of returnable drums, but will also accommodate standard dies, thus spreading the initial cost over a larger field of utility.

The head or superstruction contains all the features of a normal press and includes a safety fuse for heavy die work.

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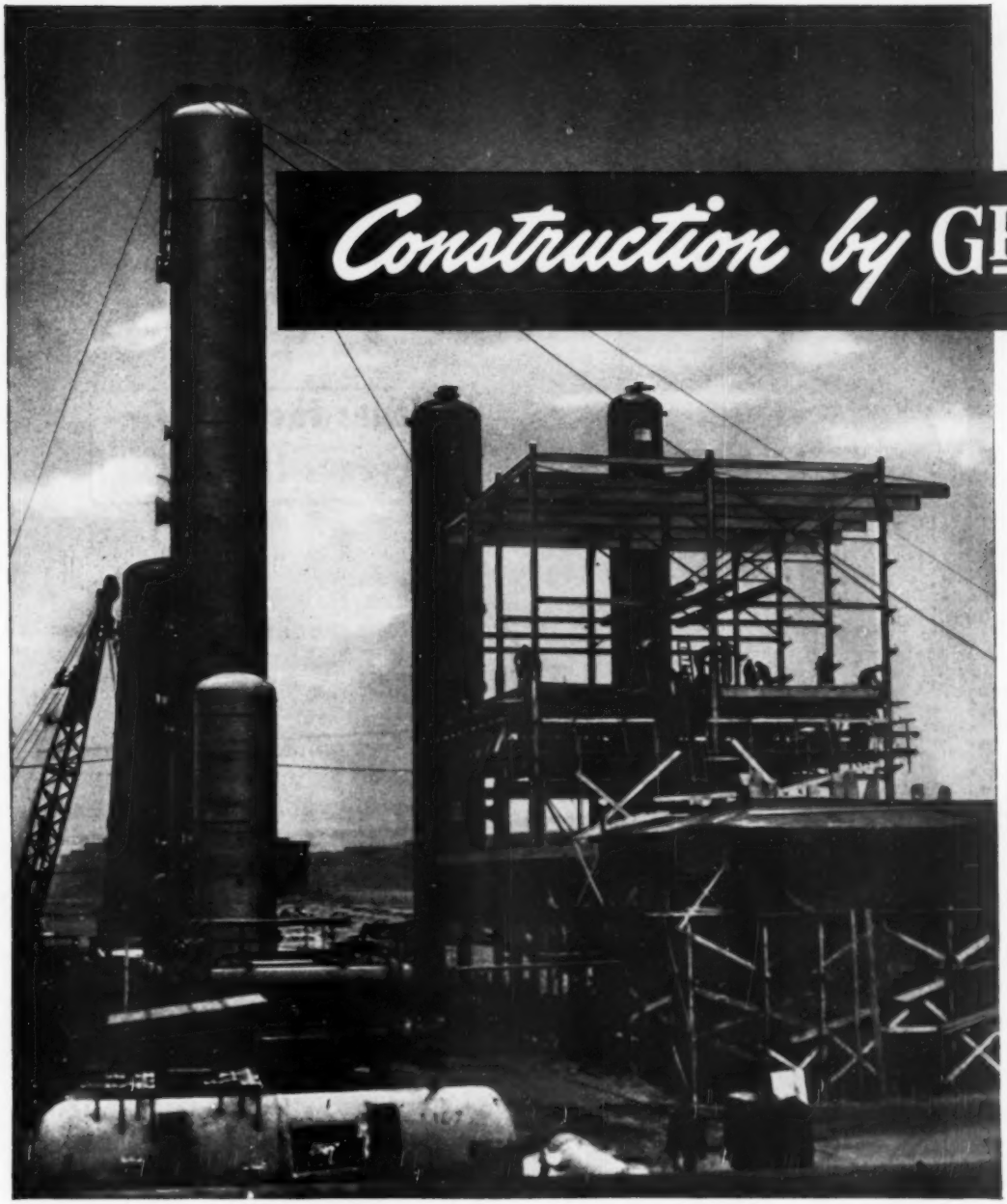

# *Construction by* GRAVER

*View at left shows Graver construction job including towers fabricated and erected by Graver.*

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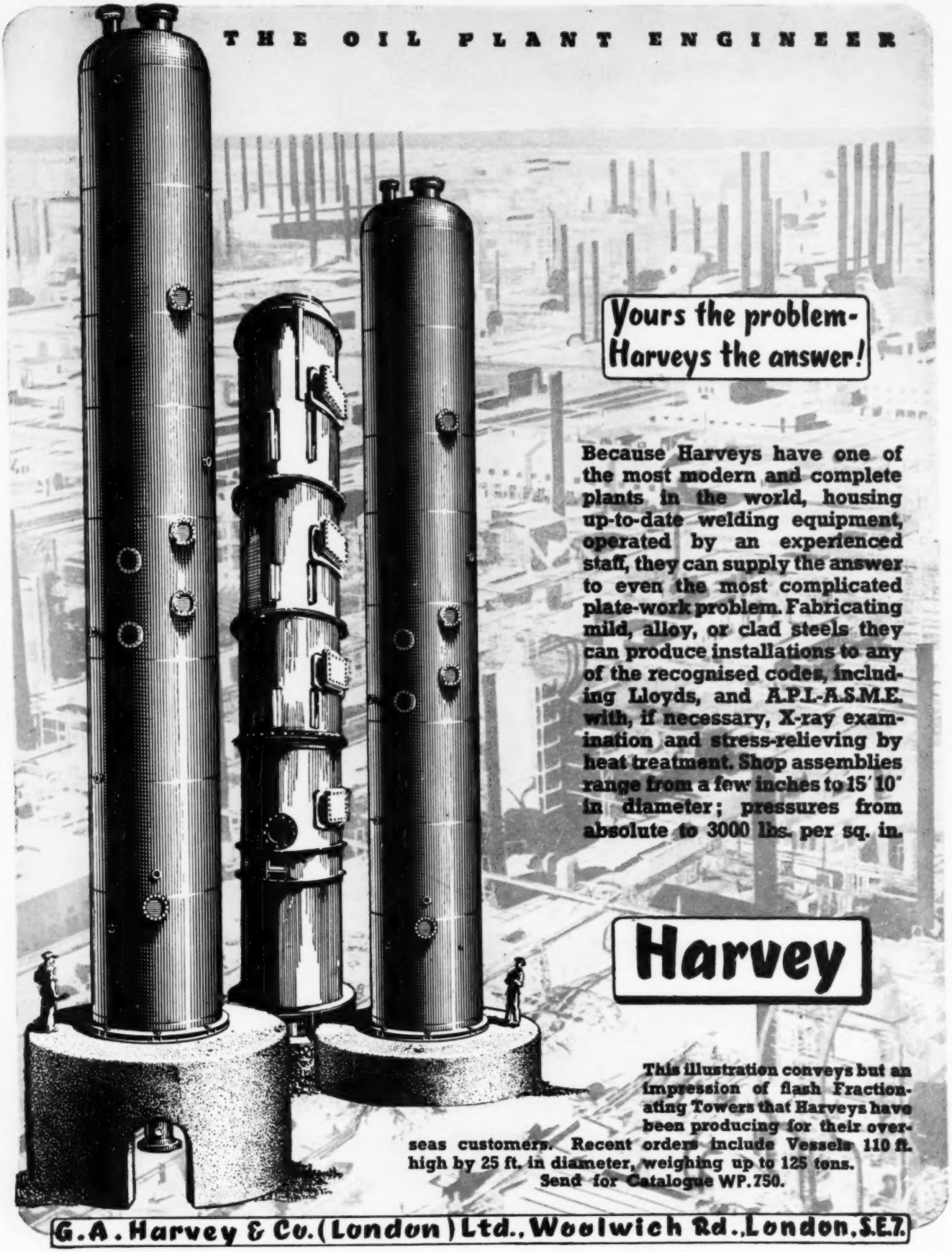

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Harvey

This illustration conveys but an impression of flash Fractionating Towers that Harveys have been producing for their overseas customers. Recent orders include Vessels 110 ft. high by 25 ft. in diameter, weighing up to 125 tons.
Send for Catalogue WP.750.

G.A. Harvey & Co. (London) Ltd., Woolwich Rd., London, S.E.7.

For greater operating efficiency and economy in all these world markets . . .

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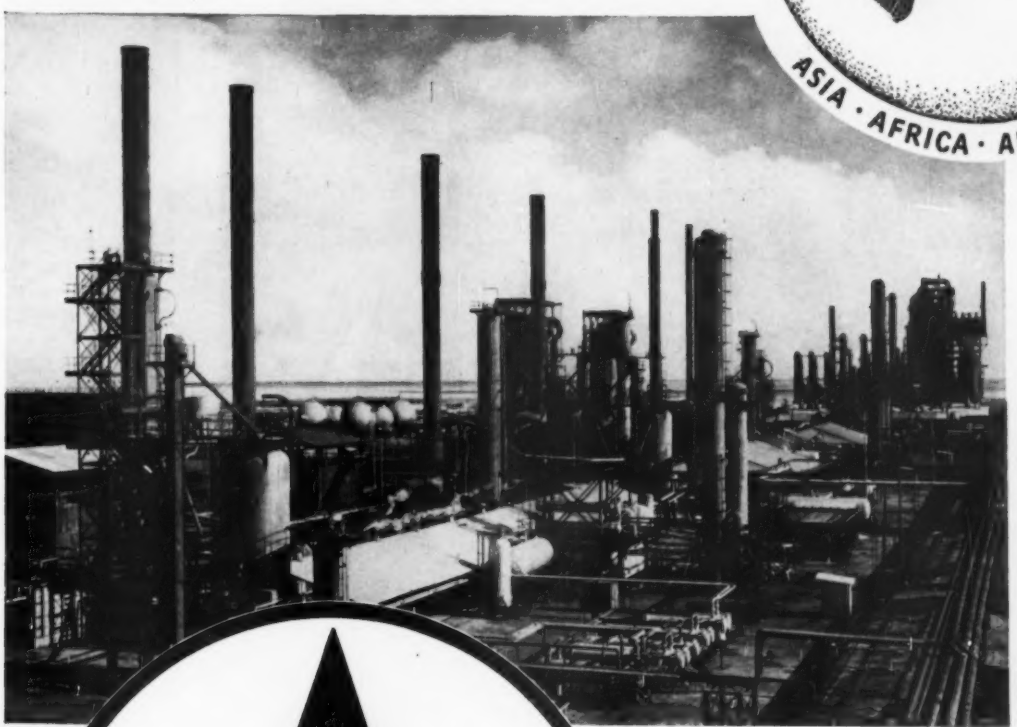

*Section of Refinery at Bahrein, Persian Gulf—one of the many Caltex installations.*

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REG. T. M.

WHETHER it is miles or merchandise—Caltex is an important factor throughout a large part of the world. In both transportation and industry Caltex Quality petroleum products provide operating efficiency and economy—longer life for ships, planes, cars, trucks and rolling stock, greater output at lower unit costs in industry.

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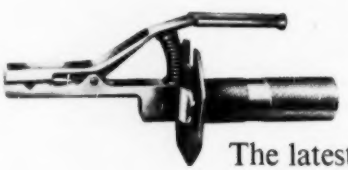
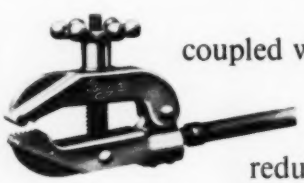
*38 years' experience has enabled The Quasi-Arc Company to produce a comprehensive range of welding accessories for every purpose.*



The latest designs coupled with improved methods of manufacture and the increasing popularity of these accessories have made possible substantial reductions in prices per single item, per dozen lots and larger quantities—this, too, at a time when prices as a general rule are tending to rise.



**Fullest particulars will gladly be sent on application.**

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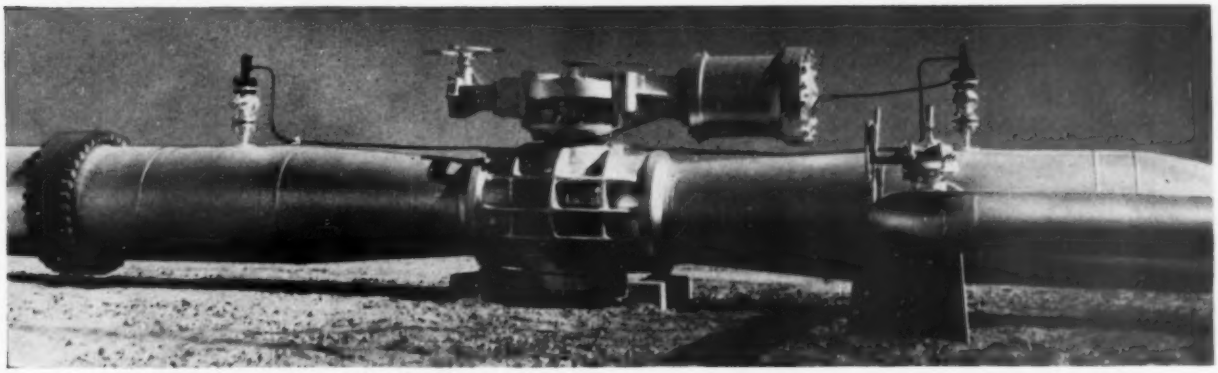
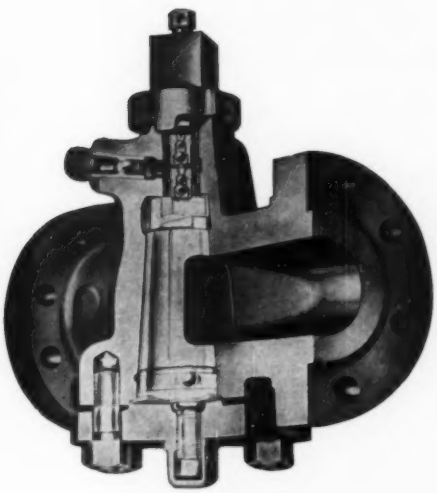


Hypreseal pipe-line valve fitted with cylinder mechanism for automatic closing in event of line break.

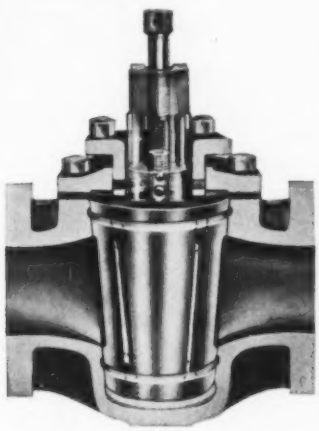
# Head off shut-off worries



Hypreseal Type

***Pressurized lubrication***
***Tapered, jackable plug***
***Unexposed seat***
***Positive rotary action***
***Adjustable under pressure***
***Streamlined passageways***

When you want a tight shut-off all along the line you have complete assurance with Audco-Nordstrom valves. You don't have to worry about dust, abrasives or suspensions in the line fluid interfering with valve closure. The Audco-Nordstrom rotary plug, sliding on its protected lubricant seat, closes sleeve-like instead of depending upon an imposed thrust against an exposed seat. Pressurized lubrication surrounding each port prevents leakage internally and externally. This is valve engineering at its best; valve operation so positive, so sure, that no other means of line control can equal it.



Standard Type

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Uninterrupted operation requires valve dependability. The arteries of any gas or petroleum operation are its flow lines. Top capacity production requires perfect functioning of every line. Audco-Nordstrom valves insure uninterrupted operation; quick, positive shut-off and freedom from hazardous leaks because their inherently sound engineering design has eliminated every valve weakness. Internal lubrication, serving the triple function of facilitating plug rotation, sealing the ports and jacking the tapered plug, is a vital asset that alone makes Audco-Nordstroms the most advanced valves of industry.

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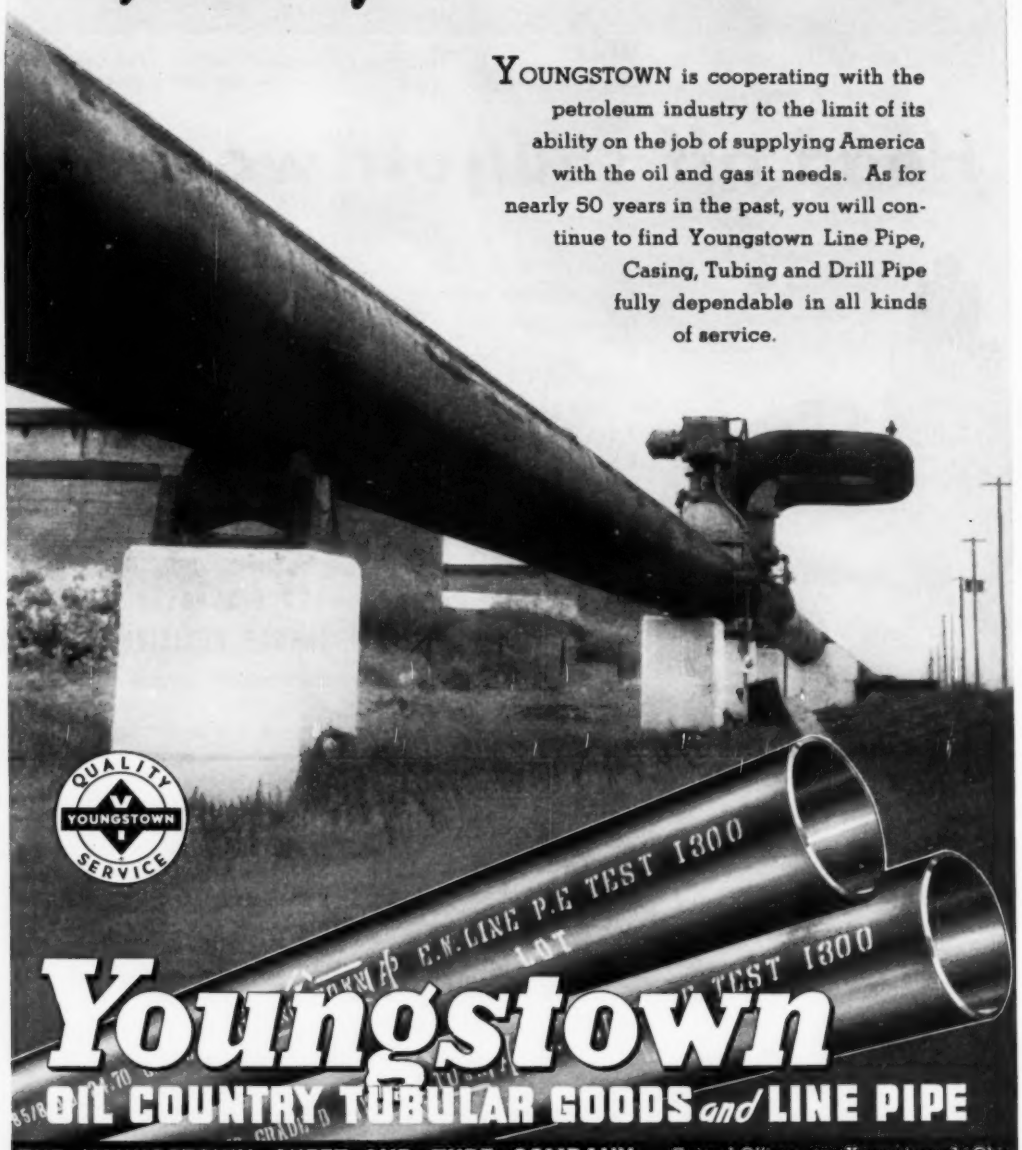


# Youngstown

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**Because It Has Exactly What The Town Needs And Wants!**

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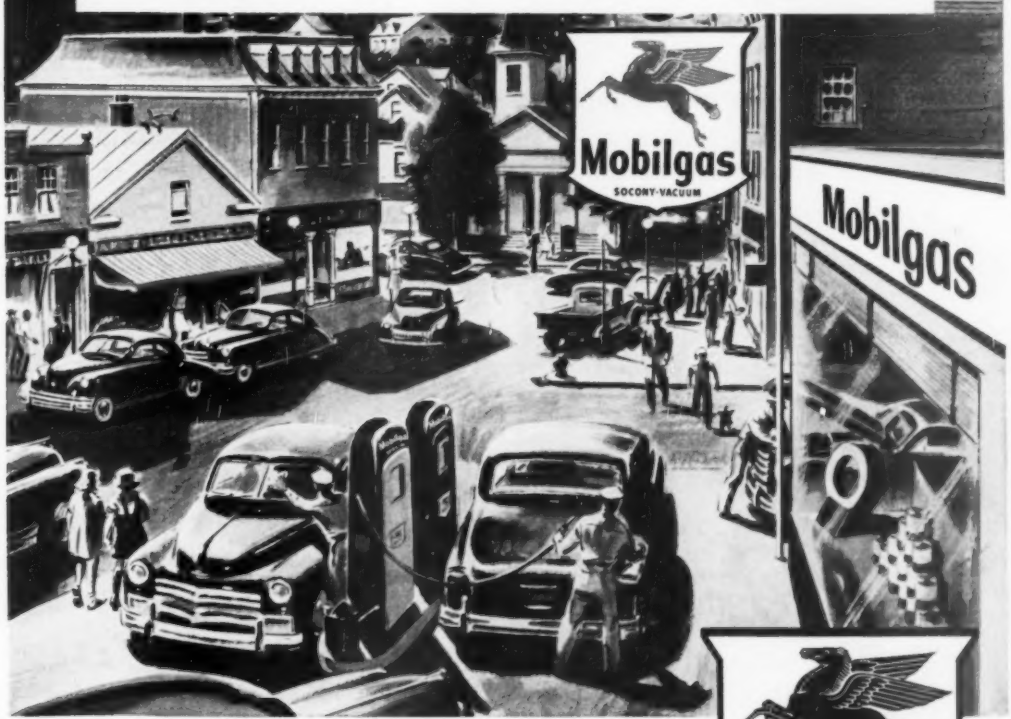
"Little business"? . . . Yes . . . but count on your Mobilgas dealer for *fine service and quality*. He's backed and supplied by the competitive efficiency and integrated organization of a leading American oil company—Socony-Vacuum.

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**45,000 INDEPENDENT DEALERS IN THE U.S.A.**

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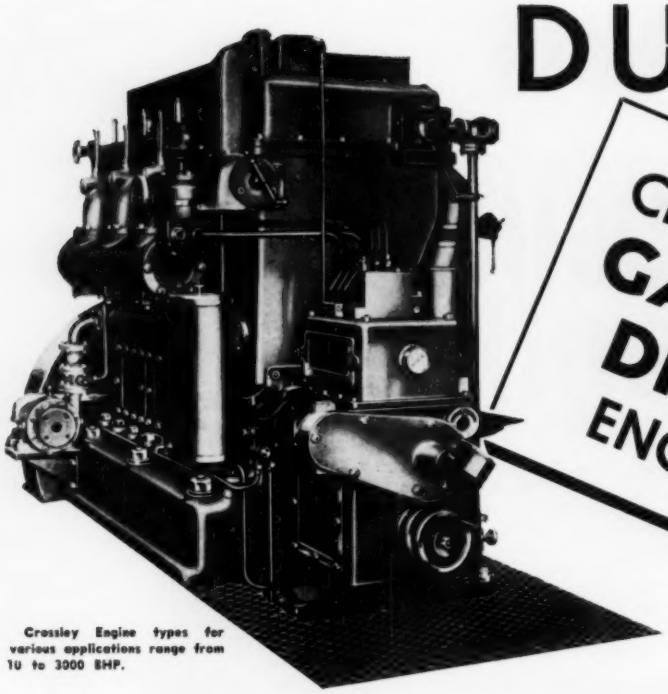
# DUAL FUEL

## CROSSLEY GAS-DIESEL ENGINES



Crossley Engine types for various applications range from 10 to 3000 BHP.

The illustration shows a three-cylinder 130 BHP—500 RPM Crossley Dual Fuel Engine, designed to use all descriptions of Diesel oils, Town gas, Suction gas, Sewage gas, Natural gas, and Blast Furnace gas.

The change over from one fuel to another is accomplished by simply moving a lever whilst the engine is running. There is no dismantling of parts, thus saving time normally spent in a change over.

The amounts of oil and gas in use can be varied from the very small quantity of oil required for ignition, to any greater quantity up to 100 per cent of oil. This is useful in cases where the supply of gas varies, such as with Natural or Sewage gas.

The Engine is totally enclosed, and marks a big step forward in the convenience with which a change over from Gas to Diesel Oil, or vice-versa can be made.

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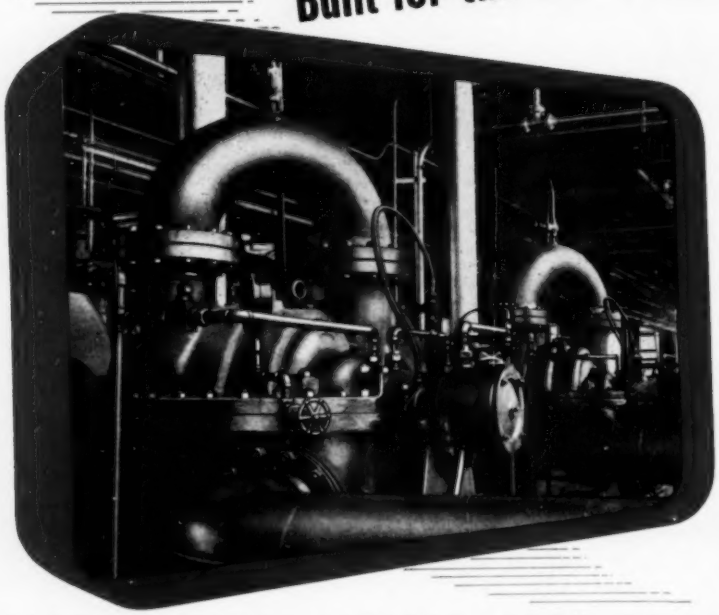

Sigmund Process Pumps are designed to deal with difficult pumping problems, where extreme temperatures, high pressures, and corrosive and/or volatile liquids are to be handled. They are built to the specifications of the leading Oil and Chemical Companies throughout the world, and a comprehensive range of pumps is available.

*The photograph shows a battery of Sigmund Process Pumps installed in a new Petroleum Refinery in Venezuela.*

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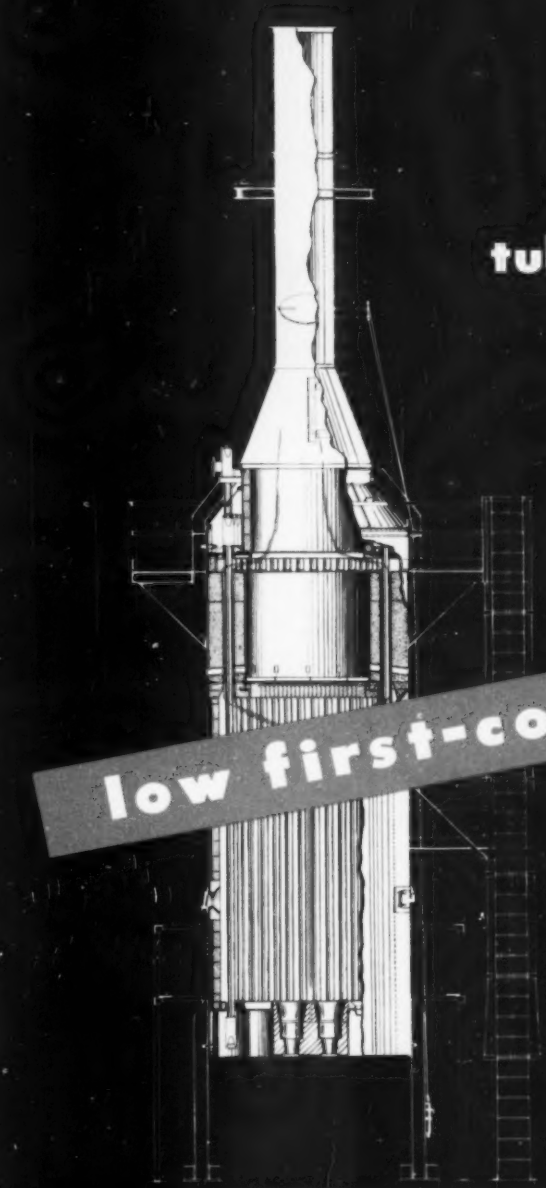
**TERMINAL HOUSE, 52 GROSVENOR GARDENS, LONDON, S.W.1. Tel: Sloane 2201-4.**



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suspended tubular structure—
complete refractory lining—
large combustion volume—

A "Quickie estimate" of the cost of this heater can be developed for any process heating requirement.

For complete description:
**write for Bulletin 0-49-7.**

FOSTER WHEELER CORPORATION
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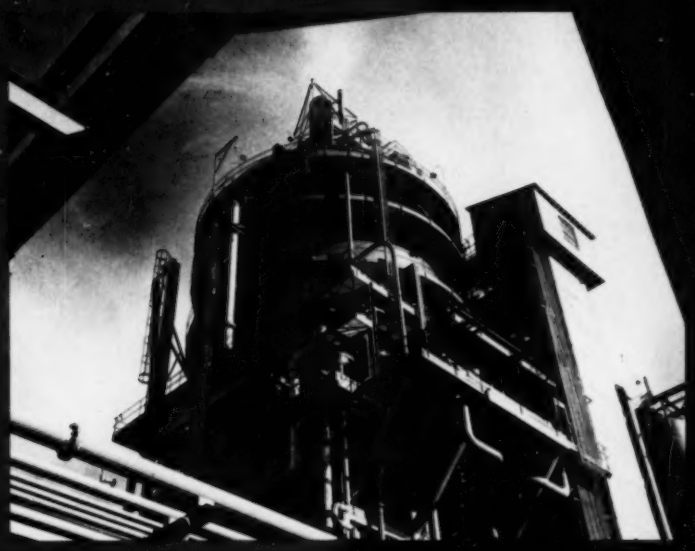

# "fluid" regeneration

## 1,000 tons catalyst per hour

41 feet in diameter, and 160 feet above grade, this regenerator is supplying regenerated catalyst for a large "fluid" unit. Coke is being burned off the spent catalyst at the rate of 20,000 lbs/hr., liberating approximately 280,000,000 btu/hr.

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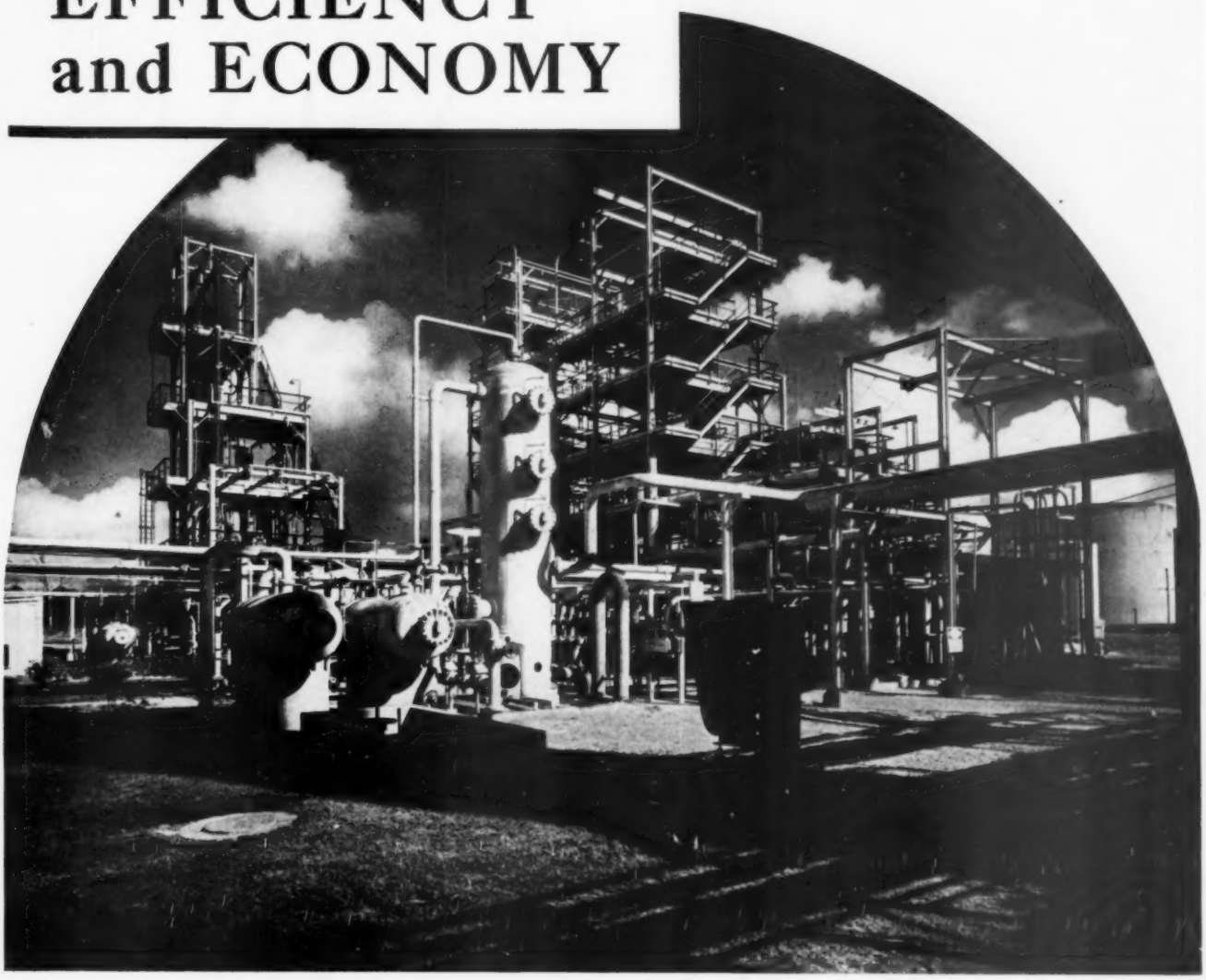
# EFFICIENCY and ECONOMY



IN the planning and execution of expansion programs, Stone & Webster Engineering Corporation offers to industrial organizations the efficiency and economy resulting from a competent and coordinated engineering and construction staff with broad experience in all phases of design and construction.

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Right:—Class 300 "ALLEY" Globe Stop Valve with Stainless Steel trim.

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**Promise of better transportation...**To a nation "on the go" it means more and better fuels and lubricants to operate the ever-increasing number of buses, trucks, automobiles, trains, planes and ships . . . for speedier, surer movement of goods, for faster, safer travel.

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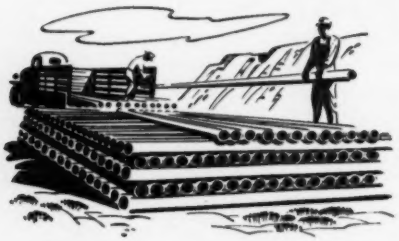
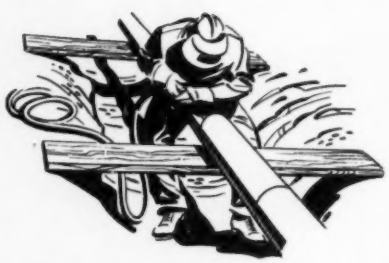


***Uniform Roundness***—Pipe ends match up perfectly, speed construction, cut costs.

***Easy to Bend***—High ductility steel makes bending in the field easy.



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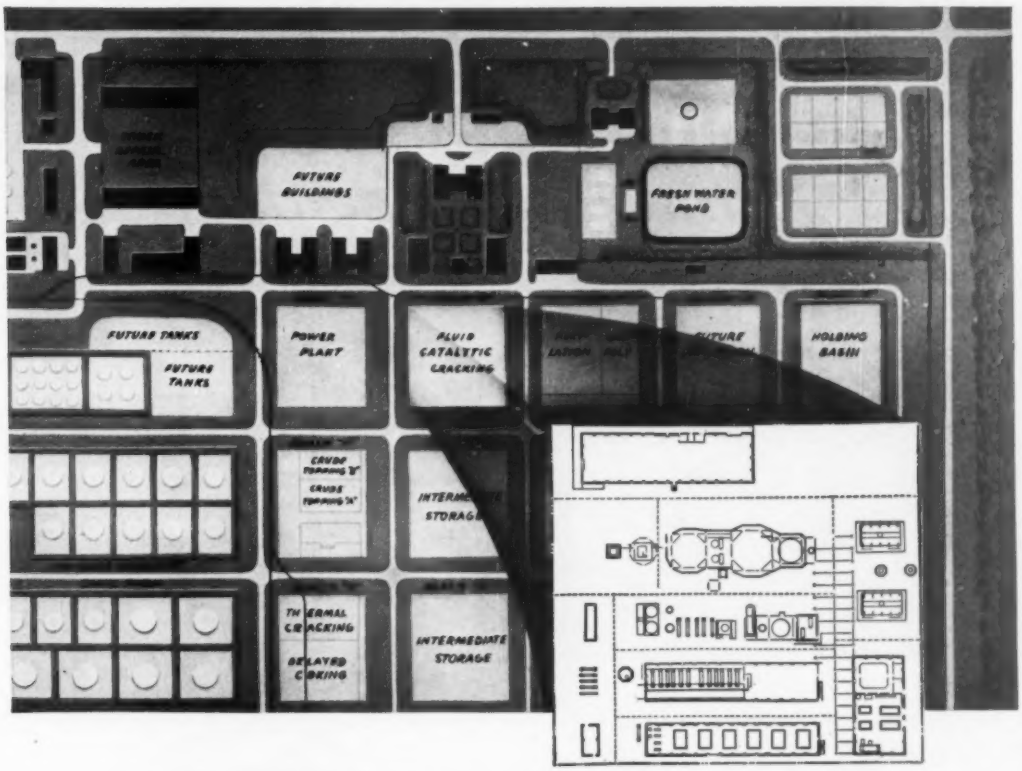
**N.B.** While it is axiomatic that return on investment—the *ultimate earning power* of a refinery unit when actually on stream—is the only true evaluation of competitive engineering recommendations, initial plant costs remain a major factor in refiners' decisions on plant installations. M. W. Kellogg takes specific steps to *minimize initial plant costs* consistent with the achievement of *highest ultimate earning power.*




## PLOTTING TO SAVE THOUSANDS OF HOURS

The process plan is approved. Now comes the engineering—a simple phrase but a mammoth task. Proper coordination at this point can mean thousands of engineering hours saved . . . many weeks cut off final delivery date of the completed refinery.

Kellogg solves this problem in a unique manner. *Before* design engineering is started, every project is referred to a compact engineering PLANS GROUP, composed of broadly-trained specialists in every major phase of refinery engineering. This PLANS GROUP—with the active collaboration of process, project and construction engineers—*pins down* in cooperative effort every factor that might appreciably affect the overlapping phases of the work. In short it creates a fixed yet elastic plant layout.

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This intensified, cooperative effort has virtually eliminated re-engineering time. And as production engineering now proceeds simultaneously in *all* phases, on a uniform, pre-fixed basis, the average time saving on engineering has been in the neighborhood of 20%—with a corresponding advancement of completion dates.

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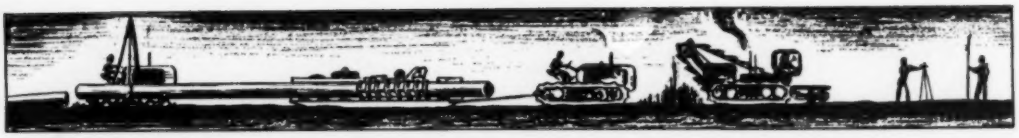
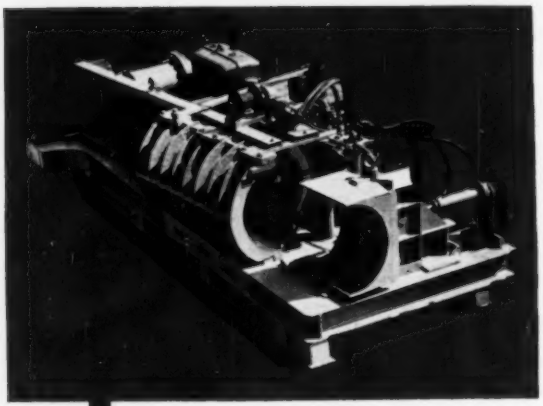


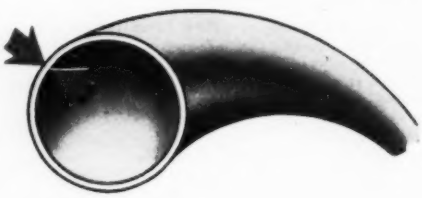
# The Cinch Pipe Bender *is johnny on the spot*



The Cinch Bender, a pipe bender that handles pipes up to 30" O.D. right on the job, saves you time, money and labor without effecting roundness or wall thickness of pipe. What's more, engineering and laboratory tests prove bends made by the Cinch Bender have improved yield and tensile strength. The Cinch Bender eliminates costly kinking and also eliminates the starting and stopping of machines so that cleaning and priming, doping and wrapping become one continuous operation. The Cinch Bender gives the owner the pipe line he desires —gives the contractor better production methods. Write for engineering details.

Bends pipe so that original strength is maintained or improved and pipe remains smooth and full-formed.

Wall thickness and roundness of pipe keep within the specifications for new straight pipe.



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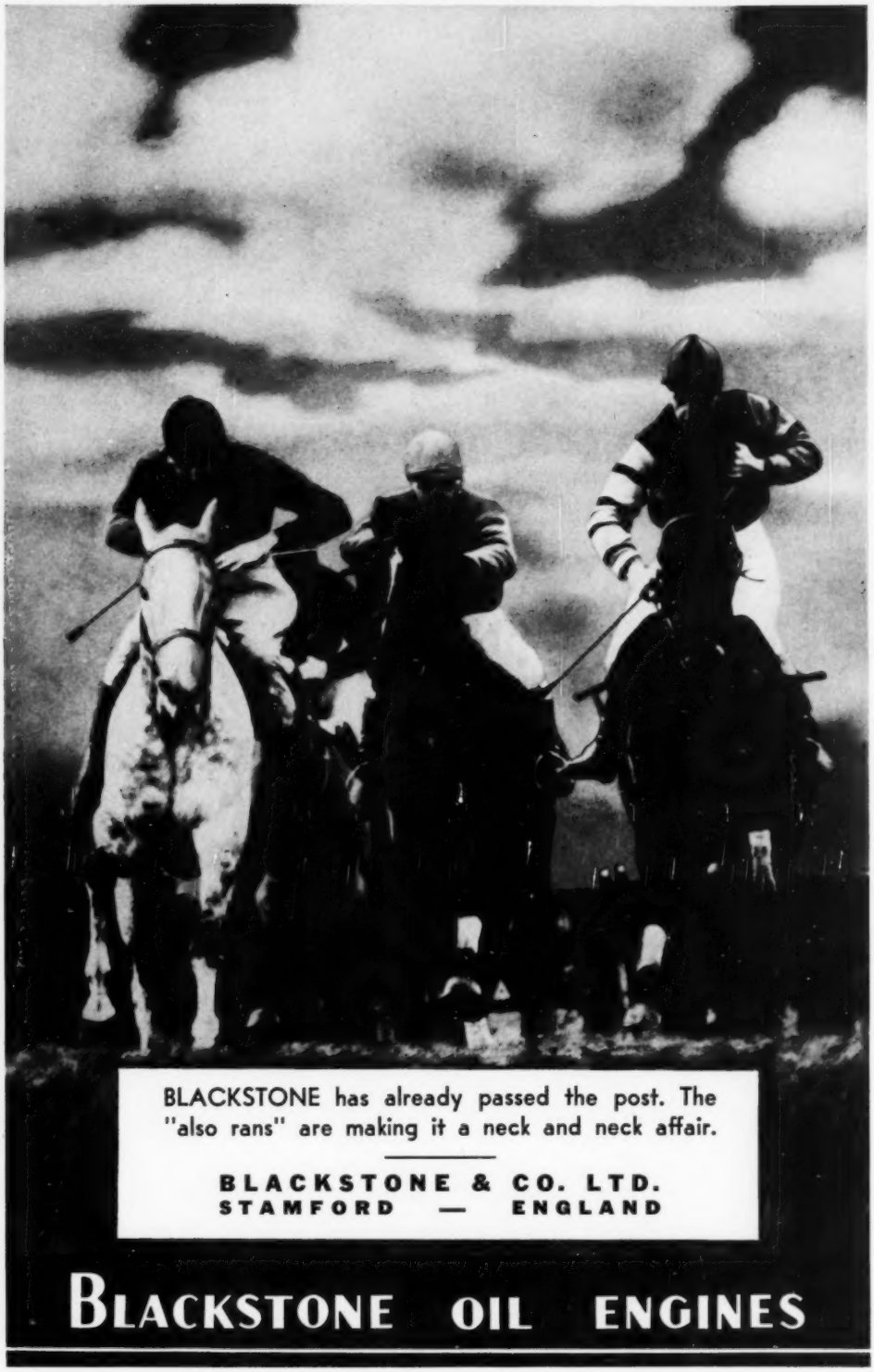
BLACKSTONE has already passed the post. The "also rans" are making it a neck and neck affair.
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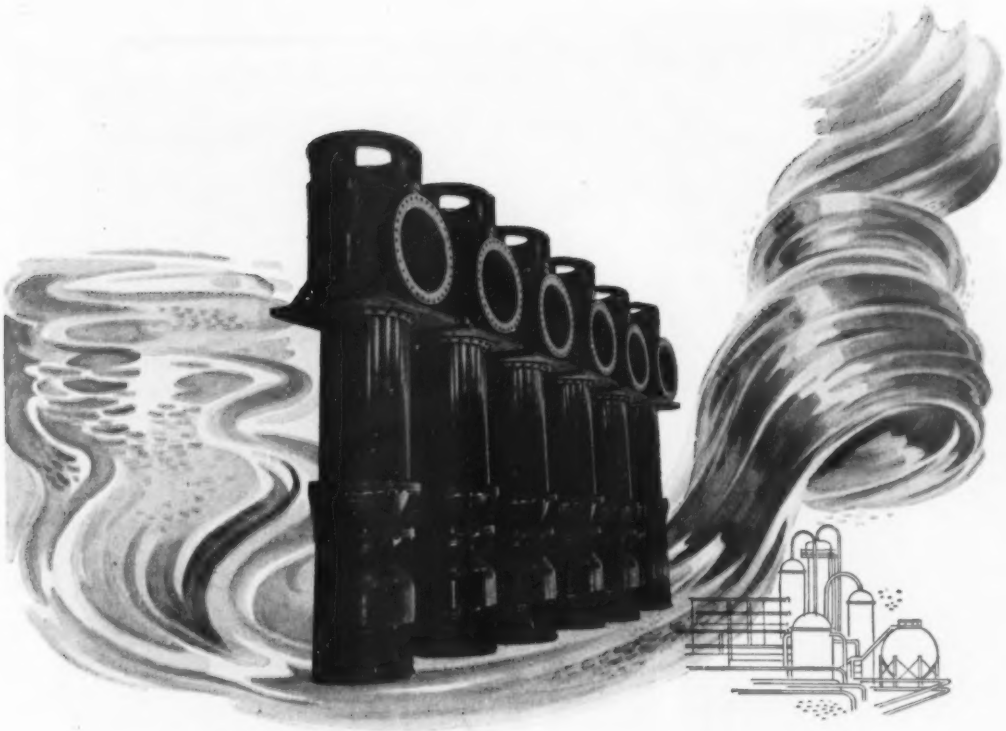
STAMFORD — ENGLAND
BLACKSTONE OIL ENGINES



## WHEN YOU NEED TO LIFT A RIVER

Gasoline made from natural gas will soon flow from the Carthage Hydrocol plant in Texas. The process gives off so much heat that the engineers called for cooling water amounting to a river 20 feet deep, 225 feet wide moving at 4¼ feet a minute.

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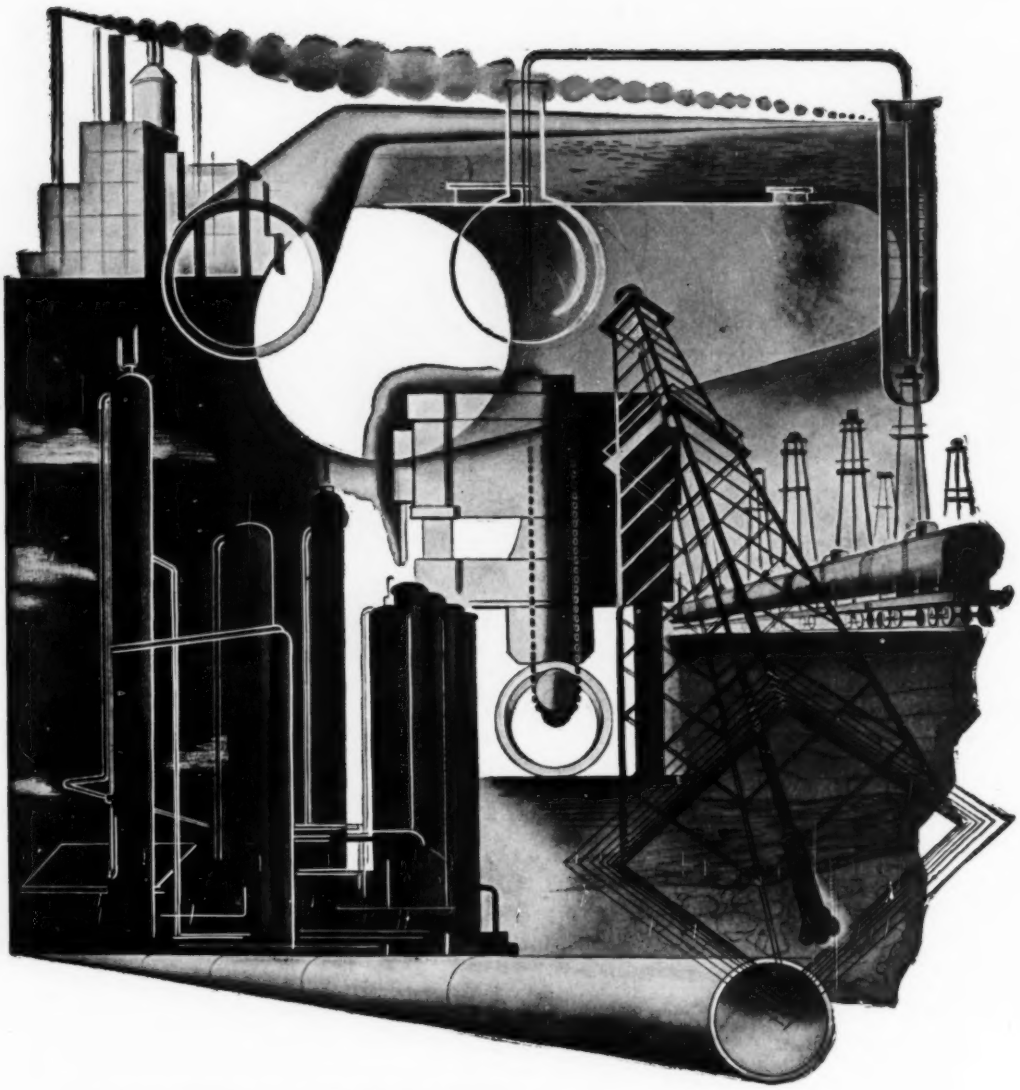

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# *The* Wiggins Lodek Floating Roof

**. . . designed specially for the storage of corrosive oil products. The entire under surface being in complete contact with the tank contents, no vapors are trapped or can collect beneath the roof.**

**The basic exclusive conservation features of the Hidek Roof including the triple seal and extra large pontoons are retained.**

Write for bulletin FR-3 which gives further details on Wiggins Lodek Floating Roofs.

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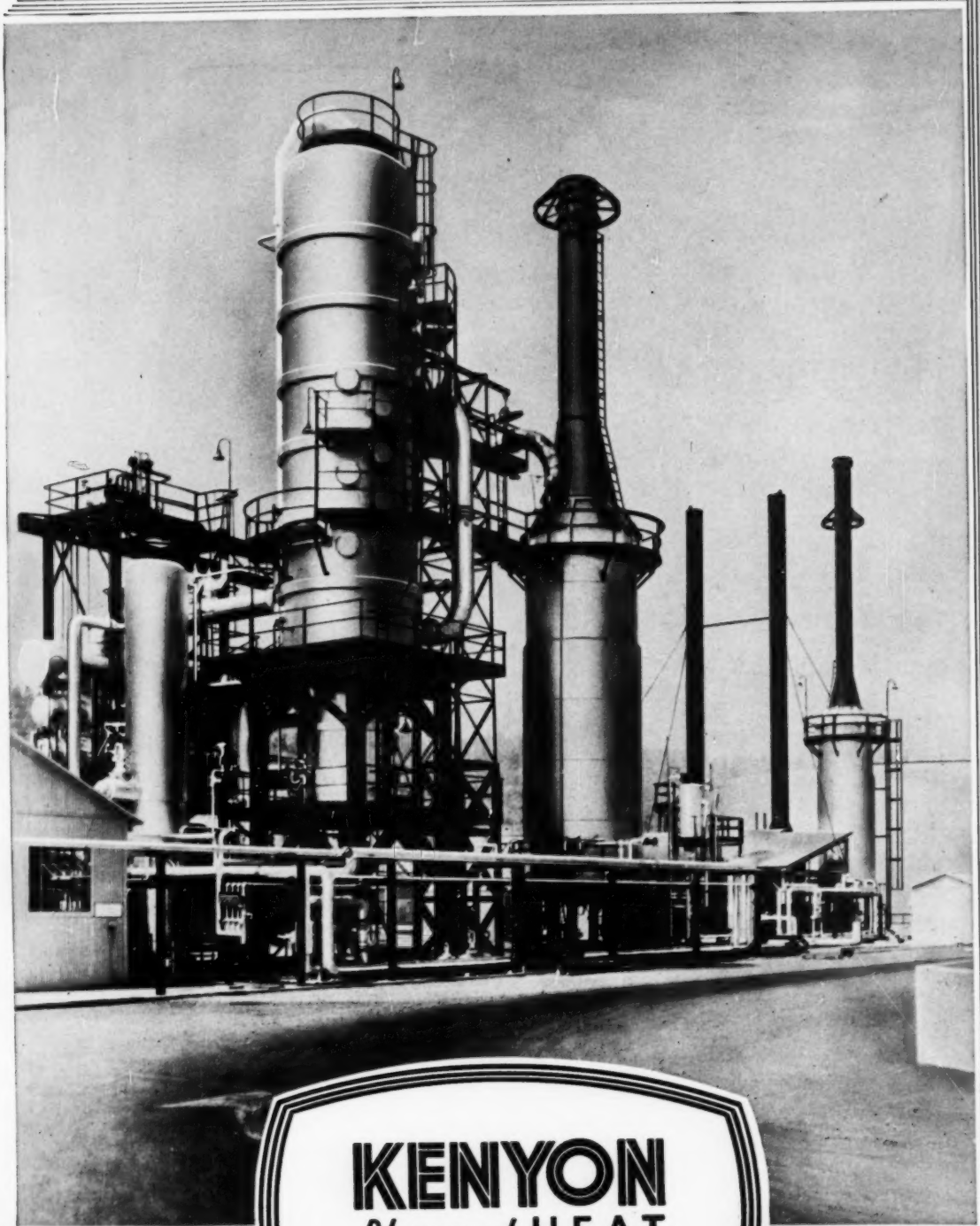
FRANCE: Etablissements Delattre & Frouard reunis, Paris

# HEAT INSULATION for all plants



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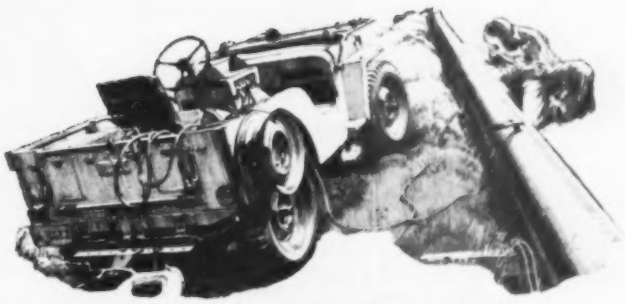
The 4-wheel-drive Universal 'Jeep' saves valuable time getting men and equipment through to jobs that must be done in hard-to-reach places. It goes through mud, sand or snow, climbs steep grades, crosses rough open country—gets to the job, helps with the job, whenever and wherever needed.

Its "go-anywhere" ability makes the 'Jeep' top choice with drillers, maintenance men, exploration crews, surveyors and pipeline workers who need a machine that virtually goes anywhere and does anything.



When equipped with 300 amp. arc welder, the Universal 'Jeep' becomes a self-powered mobile welding unit, ideal for on-the-spot pipeline repairs and for many other kinds of work in remote places.

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**and**
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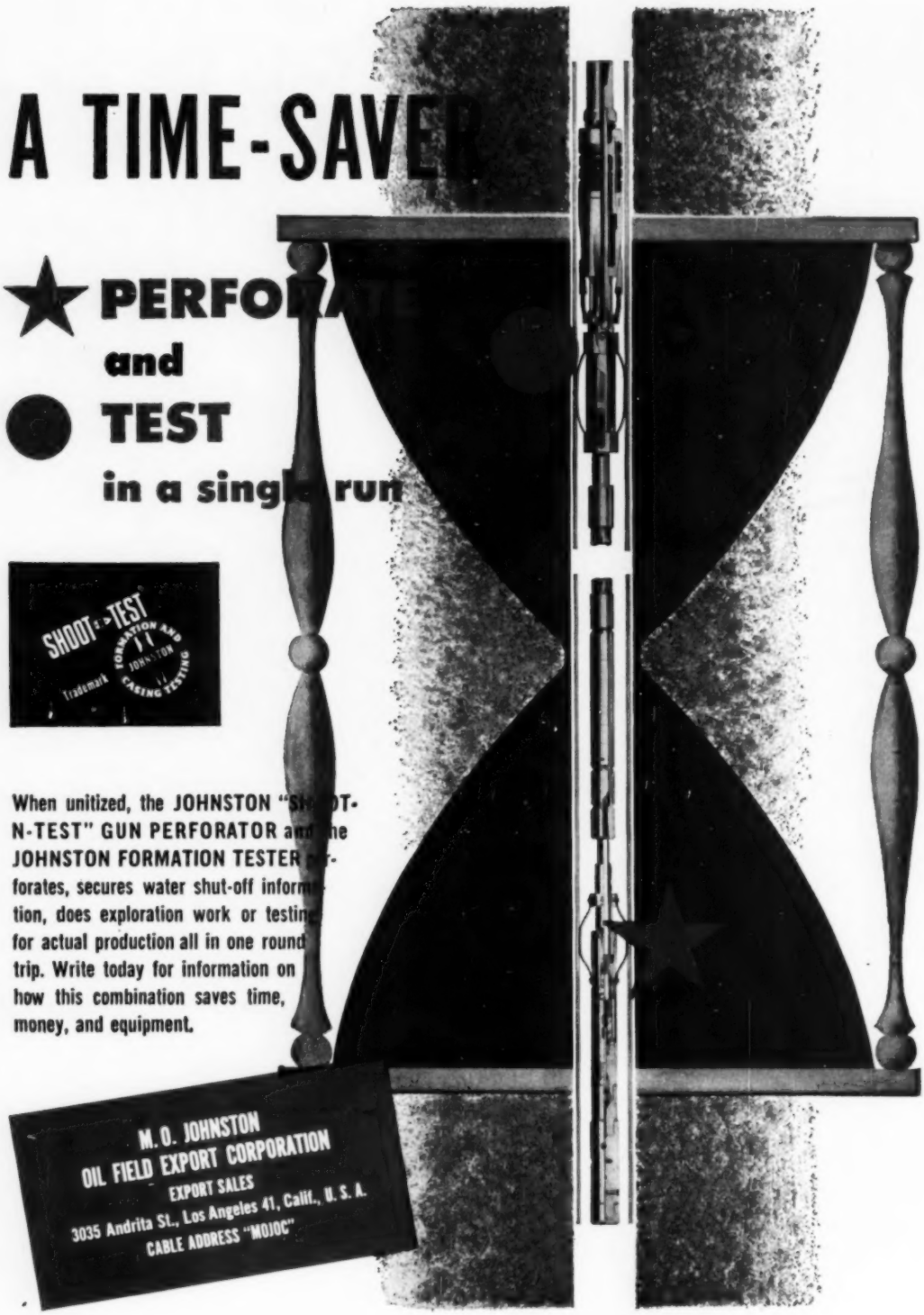
**in a single run**



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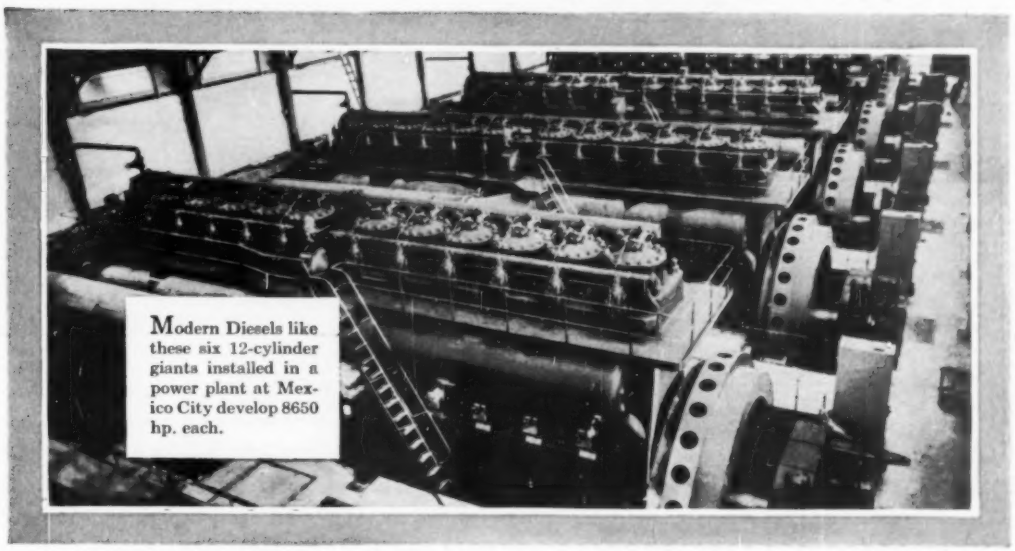
# Dr. Diesel's Big Idea

## How petroleum progress helped develop a new type of power

*The world's first commercially applied Diesel engine, built by Adolphus Busch in St. Louis 51 years ago.*



Modern Diesels like these six 12-cylinder giants installed in a power plant at Mexico City develop 8650 hp. each.

*Today Diesel engines are largely supplanting steam on the railroads. Giant Diesels develop electricity, power ships. Lightweight Diesels power trucks, buses, contractor's machinery and other units.*

Eliminating spark plugs and carburetor, Dr. Diesel in 1892 patented an internal combustion engine designed to run on cheaper, heavy fuels. But years of research were needed to make the idea practical. Engineering research had to find ways to reduce weight and solve the difficult problem of injecting the fuel against high pressure. Petroleum research had to develop lubricants to reduce the fouling of pistons, rings, cylinders and valves under the intense heat and pressure—a field in which Texaco has been pre-eminently successful.

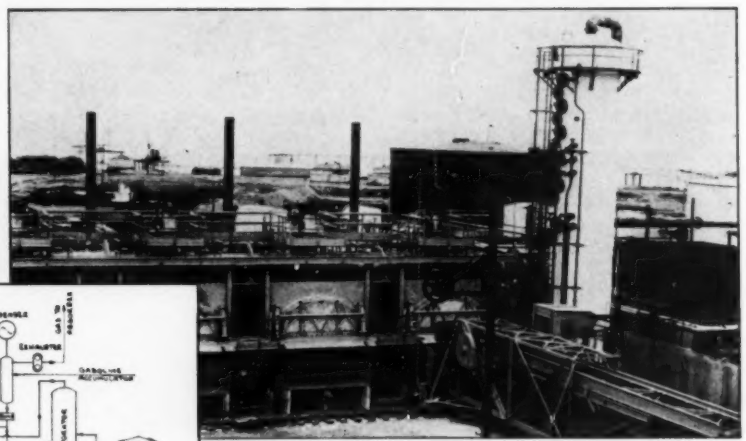
**THE TEXAS COMPANY**

***Petroleum Promotes Progress***

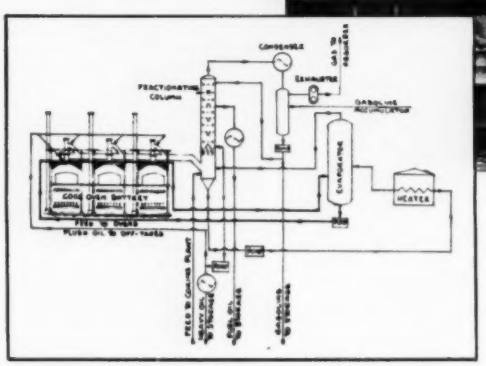
TEXACO

**PROBLEM:** **How to Profitably Convert Residuums to Metallurgical Coke or Electrode Carbon**

**SOLUTION:** **Curran Carbonizing Process: A flexible and economical method of high temperature coking**



Curran Liquid Hydro-Carbon Coking Plant



Simplified Flow Diagram of Curran Process

The problem of profitably reducing petroleum residues to high-quality solid coke has been met and mastered in the Curran Carbonizing process . . . a tried and proven method of high temperature coking that should interest every organization desirous of converting heavy residues to readily saleable products.

The facilities of our completely equipped Pilot Plant are available for tests of your material on a commercial scale and at actual cost to us. Inquiries are invited and will receive prompt attention. Wire, write or phone.

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Baroid

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## *A New Liquid Alkaline-Tannate Compound*

Baroid now offers a mud-thinner and conditioner in its most convenient form: a liquid already carefully proportioned and ready to add to water, cold or hot • Tannex Red Mud Conditioner eliminates the necessity for storing and handling large quantities of flake caustic and powdered quebracho. It does away with the hazardous, inaccurate, and time-consuming mixing of corrosive ingredients.

Each gallon of Tannex Red Mud Conditioner contains the equivalent of four pounds of dry caustic soda and four pounds of dry Tannex. It comes in steel drums, 650 pounds net weight, ready to mount for instant use. The drums will stand any except freezing weather without spoilage of the product.

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*Lowers Viscosity*
*Reduces Water Loss*
*Controls Gel Strength*

PATENT LICENSES, constituted as to sources of supply of materials, but on equitable bases, will be granted to responsible oil companies and others desiring to practice the subject matter of any and/or all of United States Patents Nos. 2,041,086, 2,044,735, 2,044,936, 2,094,316, 2,119,829, 2,296,877, 2,367,694, 2,393,163, 2,393,173, 2,417,507, and further improvements thereof. Applications for licenses should be made to Los Angeles office.

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P. O. Box 2558, Terminal Annex, Los Angeles 54, Calif.
*Send me detailed information on Tannex Red Mud Conditioner.*

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# WORLD PETROLEUM

*Founded by Russell Palmer*

PUBLISHED BY MONA PALMER

THE MANAGEMENT PUBLICATION OF THE INTERNATIONAL PETROLEUM INDUSTRY



**E. W. Mayo**
*Editor*

**J. C. Chatfield**
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**Richard Sala**
*Art Director*



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***This Month's* Cover**

After 20 years of operation the Carter Oil Co. refinery at Billings, Mont., recently was shut down prior to the opening of the new Rocky Mountain plant. The cover photograph shows Leland Lyons, assistant stillman, closing a little-used valve as the refinery run ended.

**AGE-OLD REDWOOD FIBERS . . .** bring new effectiveness to the job of preventing and restoring lost circulation. PALCO SEAL is easy to store and introduce into the drilling mud. It does not deteriorate when exposed to moisture. Its natural sealing properties are enhanced by outstanding swelling qualities. Economical, tried and proved, PALCO SEAL is recommended as the most practical and effective solution to a common problem. For further facts and prices contact your Howco representative.

**HALLIBURTON OIL WELL CEMENTING COMPANY**

**DUNCAN, OKLAHOMA**

# EDITORIAL

## THE CHINESE PUZZLE OF INDUSTRY REGULATION

AMONG the headaches that assail the managers of industrial enterprises, not the least onerous are those arising from governmental measures intended to regulate the conduct of business. Some of these perplexities are due to inconsistencies in the laws themselves; others result from conflicting interpretations by the numerous federal agencies that have a hand in these matters. In one of the most recent cases affecting the oil industry, the Supreme Court, by the narrow margin of five to four, delivered a decision which some of its own members regard as directly contrary to the act's avowed purpose of promoting competition.

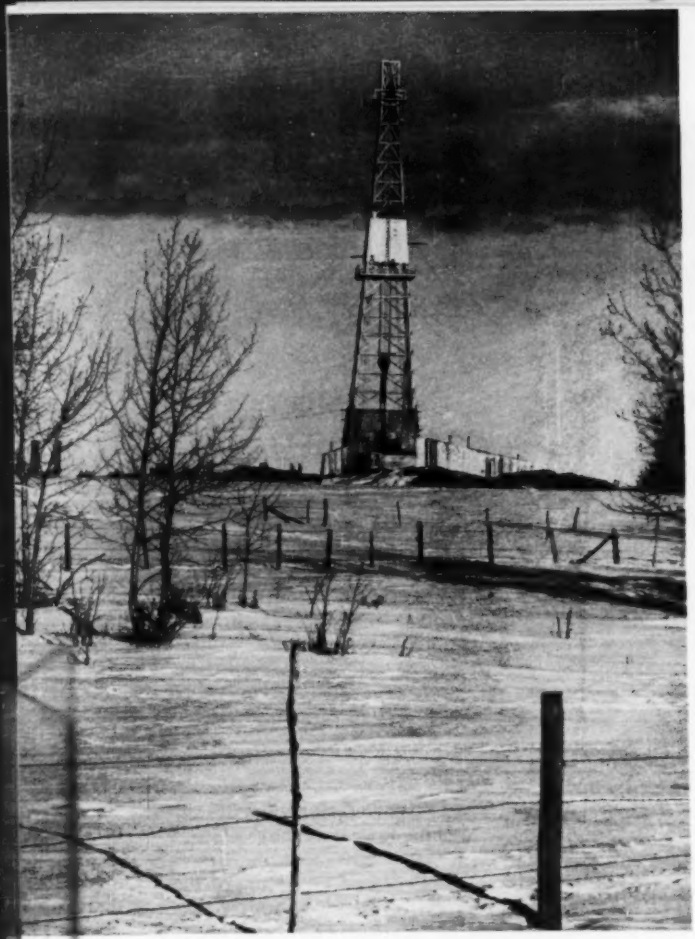
In recent years many oil companies have divested themselves of the ownership of service stations, selling or leasing these to individual operators in the belief that, if the operators had a direct financial interest in their sales volumes, it would lead them to become more active competitors while at the same time it would remove a favorite ground for the charge of monopolistic practice. Since the station operative had the benefit of the extensive advertising done by the manufacturer it was considered eminently fair to ask the dealer to utilize this only in promoting the sale of the manufacturer's particular brands. To accomplish this, some companies entered into exclusive dealer contracts and a suit against Standard Oil Company of California based on this practice was decided against the company by the aforesaid narrow margin. As pointed out by Justice Douglas, one of the four dissenters, this was in effect a direct invitation to oil companies to build up service station empires of their own to the further limitation of competitive action.

While the Sherman law was designed to enforce competition some changes were made in the course of time at the behest of certain groups. The Clayton act exempted labor organizations from the interdiction against restraint of trade and later on the Robinson-Patman amendment to that act prohibited discrimination in price between purchasers of the same class when such discrimination tended to injure competition. It resulted from complaints that manufacturers, specifically chain store systems, by by-passing jobbers and other middlemen were able to undersell local shopkeepers through their retail outlets.

One case that attracted the Federal Trade Commission's attention concerned the operations of Standard Oil Company of Indiana in its Detroit marketing area. The oil company for the most part sold its products directly to service stations but four of its customers, classed as wholesalers because they had their own storage and delivery trucks, were allowed a lower price in accordance with general practice in the business. It happened that three of the middlemen engaged in retailing on their own account and two of them undersold the service stations which bought directly from the company. The decision of the Court of Appeals was that the existence of a difference in price was in itself evidence of injury to competition and that responsibility rested with the company. Thus, in this instance, the law was turned against the very class it was designed originally to protect.

One of the court findings most upsetting to business of any in recent years was the decision outlawing the basing point system. The use of basing points in determining prices, particularly for commodities in general use ranging all the way from sugar to steel, had been in existence for many years. It involved some absorption of freight rates and conferred an advantage to manufacturers on sales in their immediate localities but it did promote broad competition while providing stability of prices. In the oil industry "Tulsa plus" was in effect for many years, though its application has declined as other methods of transportation have replaced the tank car to a great extent. Under recent court rulings this method of pricing is no longer permissible but quotations must be on the basis of price at the source plus actual transportation cost to point of delivery. Carried to a literal conclusion this dictum would lead to the setting up of a series of local monopolies and the elimination of general competition since each manufacturer would have a decided advantage in the area immediately around his plant. So revolutionary would be the rigid application of this dictum that Congress is now considering legislation that would preserve some features of the basing point system, at least until full consideration can be given to the entire subject.

These are a few examples of the puzzles that confront business men in their efforts to avoid legal entanglements. With regulatory requirements being changed from time to time to meet the demands of favored groups and with the multiplication of governmental agencies the opportunities for conflicting decisions are multiplied. The old saw that the law is what the court says is more applicable than ever and the prudent businessman seeking to steer clear of one interdiction may find that he has thereby exposed himself to attack from some other quarter. The country's greatest need is for a clarification of the existing hodge-podge of laws and regulations and the adoption of a policy other than that of constant harassment of industry for assumed political advantage.



Leduc No. 1, the well that started Alberta's oil boom. All field photographs with this article by Corsini for Standard Oil Co. (N.J.)

Loren F. Kahle, president, Interstate Oil Pipe Line Co.

Dr. O. B. Hopkins, president, Interprovincial Pipe Line Co.

# CANADA'S INTERPROVINCIAL PIPE LINE WILL BE EXTENDED TO LAKE SUPERIOR PORT

When Imperial Oil Ltd. organized the Interprovincial Pipe Line Company early in the year and announced that it would build a line connecting Edmonton, Alberta, with Regina, Saskatchewan, in western Canada, it was suggested that the line might later be extended to deep water on Lake Superior. With the discovery of new fields in Alberta and the bringing in of productive wells in rapid succession, it has become necessary to apply a strict allocation to hold down output. Because of the limited capacity of local refineries which are geared to the small requirements of the immediate market, individual wells have been held to a fraction of their potential capacity.

As a result of the critical situation thus created and the growing urgency of providing an outlet for the rising tide of oil, it is now announced that the Interprovincial line will be carried through as rapidly as possible to Superior, Wisconsin, U.S.A.

Authorization for construction of the line as originally planned extending from Edmonton to Regina, a distance of 450 miles, was granted by the Canadian Board of Transport Commissioners at Ottawa on June 10. Approval of the extension from Regina to Gretna, Manitoba, 340 miles, followed a hearing on September 8. From Gretna, which is 75 miles south of Winnipeg close to the United States border, to Superior, a further 360 miles, the line and all its facilities will be owned and operated by the Lakeland Pipe Line Co. Inc., a wholly owned subsidiary, which will issue to Interprovincial first mortgage bonds to cover its costs.

In making public the news of the greatly expanded project, Dr. O. B. Hopkins, president of Interprovincial, said that by the fall of 1950 oil should be flowing through the Edmonton-Regina section of the line and that early in 1951 it should be moving to deep water at the head of the Great Lakes. He explained that the choice of the American route for the final section of the line was dictated by the fact that costs would be substantially lower than would be possible over an all-Canadian route. The distance to the American lakehead is shorter and the country is generally flat, without rocks, and an almost straight line can be followed. Much of the terrain between Winnipeg and the Canadian lakehead is rugged, broken, covered with bare rock and studded with lakes and muskeg. The physical difficulties and heavy cost of building a pipe line through such territory make it impracticable.

From Edmonton to Regina the line will be of 20-inch pipe; from Regina to Gretna of 16-inch, and from Gretna to the lakes of 18-inch pipe, Dr. Hopkins said. Orders for the purchase of pipe for the entire line have been placed, and all deliveries should be completed by the end of 1950. About 177,000 tons of steel will be required.

Initial capacity of the line from Edmonton to Regina will be 95,000 barrels of crude oil a day; east of Regina it will be 70,000 barrels a day. Additional pumping stations can be added as required to increase capacity.

Survey work on more than 400 miles of the line has already been completed. Actual construction is expected to employ between 1,000 and 1,500 men for about 150 days, and will probably be in progress at as many as 10 different locations along the line at the same time. Contractors' equipment representing an investment of approximately $500,000 will be in use on each spread.

Terminal facilities at Superior will include loading docks for lake tankers, and it is expected that some 57,000 barrels a day will be shipped by tanker to Canadian refineries. As navigation on the Great Lakes is closed for about five months of the year, storage capacity for at least 1,000,000 barrels will be constructed at Superior which will permit the steady accumulation of oil during the closed season.

Cost of constructing the line has been estimated at $85 million. An additional $5 million will be required as working capital, bringing the total projected cost to $90 million. To provide the $90 million required for construction of the line, Interprovincial will issue $72,000,000 of 3½ percent, 20-year bonds; $17,000,000 of 21-year, four-percent convertible sinking fund debentures, and 10,000 of its 4,000,000 authorized shares of $50 par value capital stock. The bonds will be placed privately with institutional investors, $37,000,000 payable in Canadian and $35,000,000 in U.S. currency. Of the convertible debentures $7,500,000 will be offered for public subscription through Canadian underwriters. The remainder will be disposed of by private sale, a large block going to Imperial Oil Ltd. Of the 20,012 shares of capital stock to be outstanding, Imperial now owns 10,000; 12 are directors' qualifying shares, and the balance will be sold privately by Interprovincial.

Completion of the line to the Superior terminal on Lake Superior will permit oil from Alberta and Saskatchewan to move by water down the Great Lakes to refineries in Ontario and will reduce their dependence on the midcontinent area of the United States from which most of their supplies have come heretofore. It is understood that to round out the equipment of the pipe line, orders will be placed for the building of several tankers, though no official announcement on this subject has been made as yet.

An announcement of importance to consumers in the Province of Manitoba has been made, however. This is the decision of Imperial Oil Ltd. to erect a refinery for which it has acquired a site of about 400 acres on the east bank of the Red River on the outskirts of Winnipeg.

Actual engineering plans are now being completed, but no decision has been reached as to when work will commence. Plans for the project are being developed with Hon. J. S. McDiarmid, minister of mines and resources, R. E. Grose, director of the department of industry and commerce, and other provincial, city and municipal officials.

Plans for the refinery are a direct result of the decision to extend the pipe line from Edmonton to Superior. The pipe line, by reducing transportation cost of crude oil from the new Alberta fields, will make feasible larger refining capacity and bring attendant benefits to the Winnipeg area.

Dr. O. B. Hopkins, president of Interprovincial Pipe Line Co. Ltd. and a vice president and director of Imperial Oil Ltd., to whom has been entrusted the carrying out of the project which will open a new and broader field to the oil of Canada's prairie provinces, has had wide experience in the production and transportation phases of the oil industry.

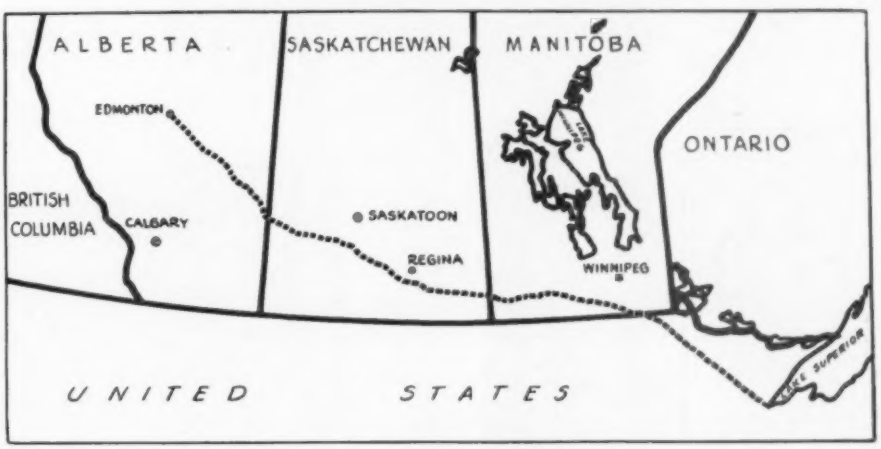
Dr. Hopkins attended Johns Hopkins University, obtaining his bachelor of arts degree in 1908 and his Ph.D. in 1912. For several years he was a state and federal geologist and member of the United States geological Survey.

He joined Imperial Oil in 1919 at the beginning of its exploratory operations in Alberta and the Northwest Territories and was in charge of a geological party operating from the Athabaska to the Pacific River. In 1920 he went to Colombia to evaluate the De Mares area which was subsequently acquired by International Petroleum and on his return to Canada in 1921 was appointed chief geologist of Imperial Oil.

In 1944 he was appointed a vice president of Imperial Oil Ltd. and was elected a director in 1945. In his spare time Dr. Hopkins is a confirmed golfer and fond of shooting and hunting. To direct construction of the Canadian line, Loren F. Kahle, president of Interstate Oil Pipe Line Company of Tulsa, Oklahoma, has received leave of absence for a period of eighteen months. Mr. Kahle was born in Toronto, Canada, of American parents, and has had twenty-five years of experience as a member of the Jersey Standard organization in pipeline work in the United States and Latin America. He was stationed at Tulsa in 1943 as superintendent of transportation for Carter Oil Company. He became executive vice president of Interstate upon its organization in 1944 and was elected to the presidency in the following year.

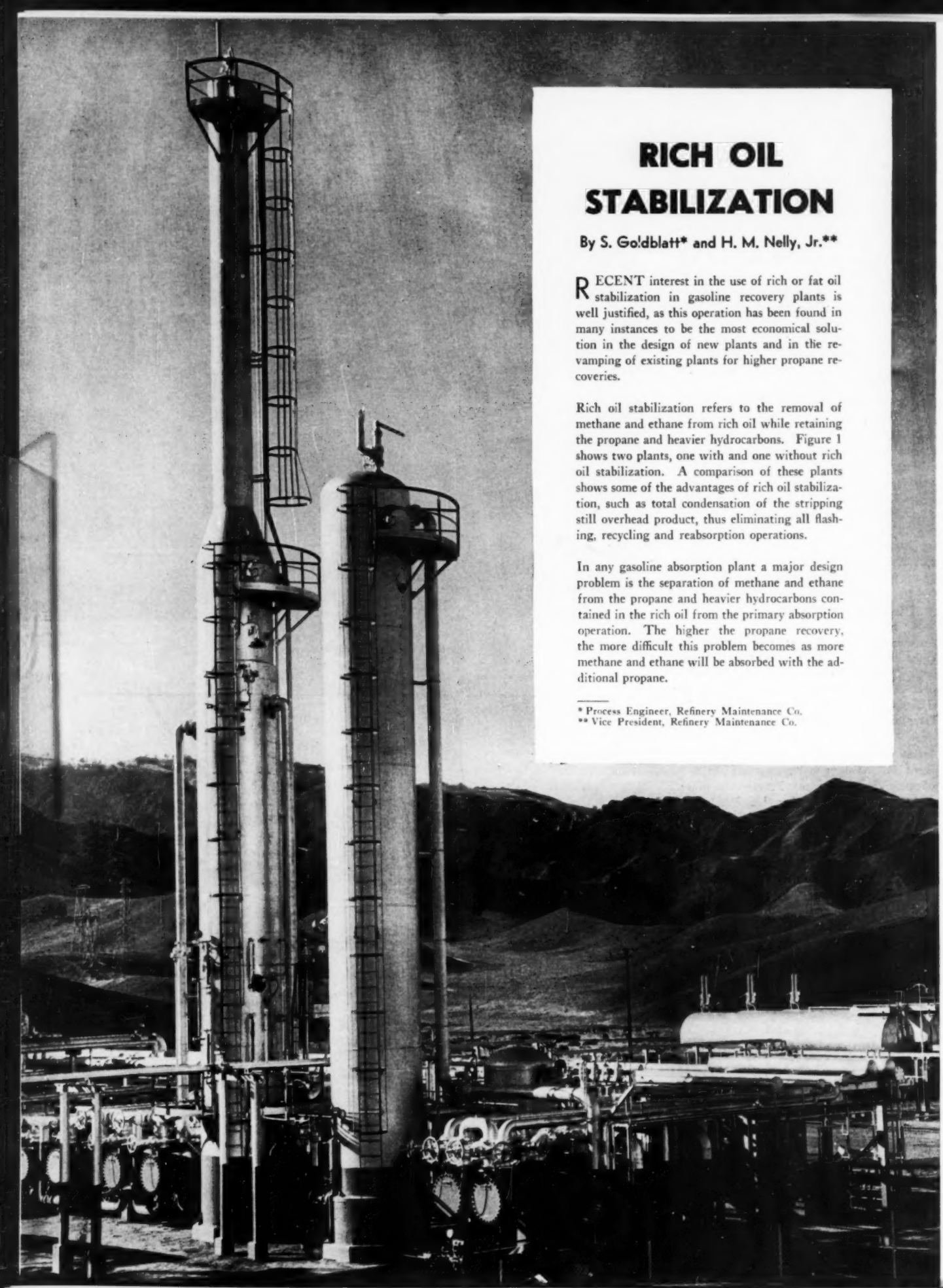
Joseph L. Seger, vice president and general counsel of Interstate was elected executive vice president and will direct the company during the absence of Mr. Kahle.

Preparing the site for a Leduc field well in winter.




Map showing route of proposed line.

Much of the crude is transported from well to the Calgary refinery by tank truck.



# RICH OIL STABILIZATION

By S. Goldblatt* and H. M. Nelly, Jr.**

RECENT interest in the use of rich or fat oil stabilization in gasoline recovery plants is well justified, as this operation has been found in many instances to be the most economical solution in the design of new plants and in the revamping of existing plants for higher propane recoveries.

Rich oil stabilization refers to the removal of methane and ethane from rich oil while retaining the propane and heavier hydrocarbons. Figure 1 shows two plants, one with and one without rich oil stabilization. A comparison of these plants shows some of the advantages of rich oil stabilization, such as total condensation of the stripping still overhead product, thus eliminating all flashing, recycling and reabsorption operations.

In any gasoline absorption plant a major design problem is the separation of methane and ethane from the propane and heavier hydrocarbons contained in the rich oil from the primary absorption operation. The higher the propane recovery, the more difficult this problem becomes as more methane and ethane will be absorbed with the additional propane.

* Process Engineer, Refinery Maintenance Co.
** Vice President, Refinery Maintenance Co.

Although a number of systems for rich oil stabilization have been proposed in the past few years, two have been more generally accepted. The first of these[1], shown in Figure 2, uses absorption for retention of the propane and heavier hydrocarbons and reboiling for the elimination of methane and ethane. The second, shown in Figure 3, likewise uses absorption for retention of the propane and heavier materials but differs from the first in that a preheater is used to heat the rich oil before it enters the stripping section and stripping is accomplished with the use of recycled vapors or wet gas in place of reboiling.

Recently, a third system, shown in Figures 4 and 5, having certain advantages over previous systems, was put into operation. This third stabilization method, developed by the Refinery Maintenance Company, and first used commercially in 1947, utilizes absorption for the retention of the propane and heavier hydrocarbons, a preheater for heating the rich oil prior to its entrance into the stripping section, and reboiling for elimination of methane and ethane.

An examination of the two flow sheets of Figure 1 shows that in the plant without rich oil stabilization, vapors are produced in a rich oil flashing operation and in the stripping still reflux drum which must be recycled and reprocessed in a reabsorber in order to prevent excessive loss of propane, butane, and gasoline that were recovered in the initial absorption. Methane and ethane are only partially separated from the heavier hydrocarbons in the single flash at the still reflux drum; so a deethanizer column in the fractionating section of the plant is necessary to produce commercially pure propane.

In the plant with rich oil stabilization, the methane and ethane are removed immediately after the initial absorption and are not further processed. Therefore, the entire flashing, recycling, reabsorption, and deethanizing systems are eliminated and an appreciable portion of the balance of the plant equipment is reduced in size.

There are many possible variations in the design of plants not using rich oil stabilization which may incorporate recompressors, double still systems, flash tanks, and reabsorption in various combinations. In a recent comparison, the estimated cost of a plant using the third method of rich oil stabilization was $180,000 or 15 percent less than the most economical design that could be arrived at without use of rich oil stabilization. Further, the utility requirements were appreciably less, which represents lower operating costs and quicker investment payout.

A description of the flow and equipment arrangement in the preheater-reboiler stabilizer shown in Figure 4 follows. An understanding of this system and reference to Figures 2 and 3 will explain the fundamental differences and manner of operation of the three systems.

The bubble trays in the absorption section above the feed tray function like a conventional absorber. Lean oil is admitted on the top tray and rich oil leaves from the bottom tray.

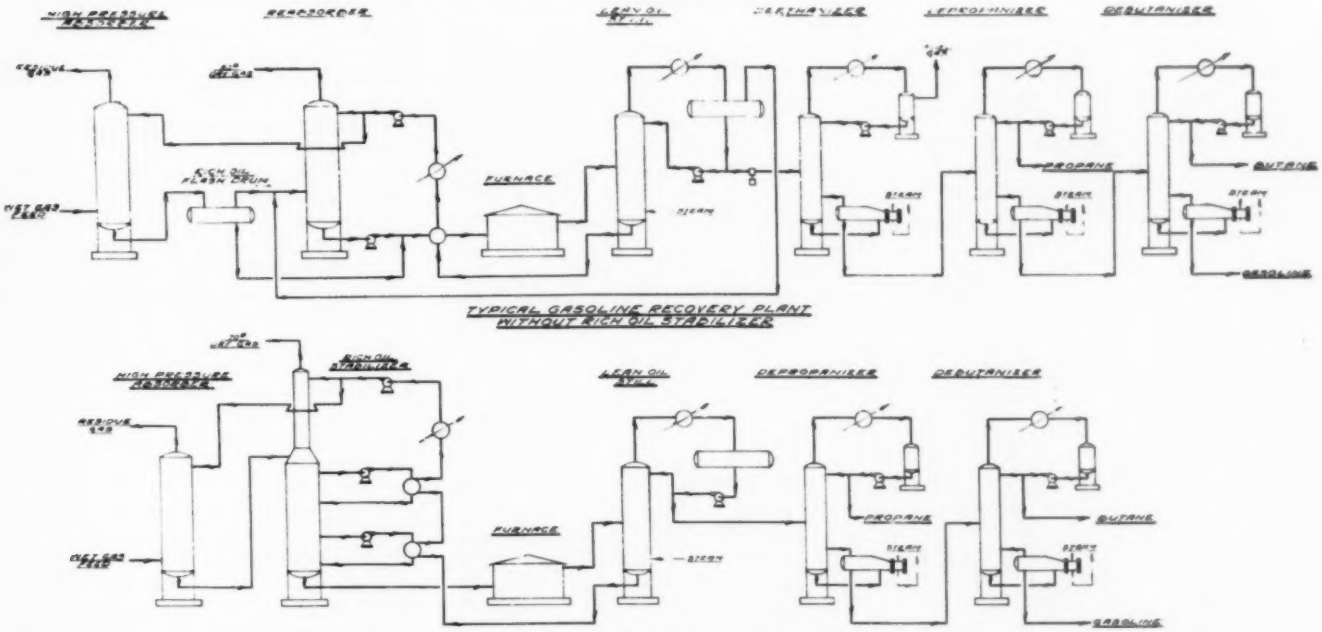
Below the feed point are bubble trays on which vapors from the stripping section contact the rich oil from the feed and absorption section, preventing stripping heat from passing into the absorption section. Actual plant operations have shown the heat exchange on these trays is very complete, and that the operation of the absorption section is independent of the heat input and operating temperatures in the stripping section.
The partially preheated rich oil leaving this heat exchange section flows to a draw-off pan from which it is pumped through a preheating exchanger back to the tower above the top stripping tray. The vapors generated in the preheater are released in the tower and the finally preheated liquid flows down over the stripping trays counter-current to the stripping vapors generated in the reboiler.

Heat to the reboiler and preheater is supplied in most cases with hot lean oil from the bottom of the still. It may, however, be supplied with steam, a direct fired heater, or a combination of these three means, depending upon the heat balance in the plant and the temperature level in the rich oil stabilizer.

Comparison of the three systems, Figures 2, 3 and 4, reveals certain important differences. Figure 4 shows actual operating temperatures while the temperatures shown on Figure 2 have been calculated using the same wet gas analysis and recoveries that correspond to the data of Figure 4. A study of these temperatures will show two very important advantages that the preheater-reboiler system has over the single-reboiler system.

First, the lean oil to the cooler is at 158 degrees F. in the one system as opposed to a temperature of 210 degrees F. in the other. The reason for this difference is the fact that the rich oil in the first case entered the preheater at 128 degrees, and in the second case entered the reboiler at 180 degrees F. In a plant circulating 360 GPM of lean oil, this temperature difference of 52 degrees F. represents an increase in duty on the cooling system of 4,100,000 BTU/Hr. Additional equipment would not only be necessary to remove this extra amount of heat, but would also have to be added, together with the necessary utilities, to the heating system of the single reboiler unit to supply

Fig. 1. Flow diagram of two plants, one with and the other without rich oil stabilization. The upper diagram shows plant without rich oil stabilizer while the lower diagram shows plant with preheater-reboiler rich oil stabilizer.




Gasoline recovery plant with preheater-reboiler rich oil stabilizer.

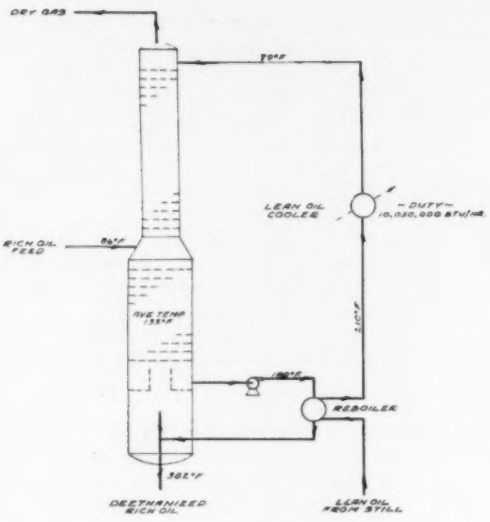



Fig. 2. Rich oil stabilizer—single reboiler system.

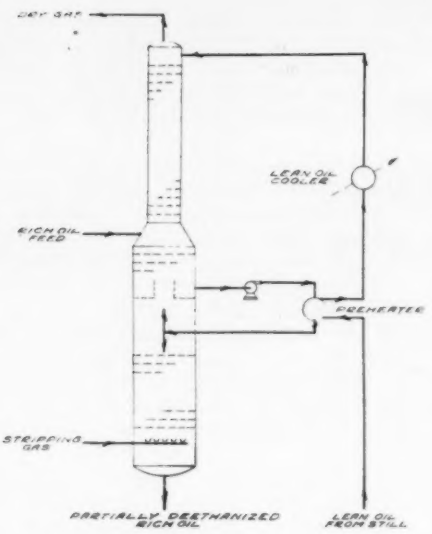



Fig. 3. Rich oil stabilizer—single preheater system.

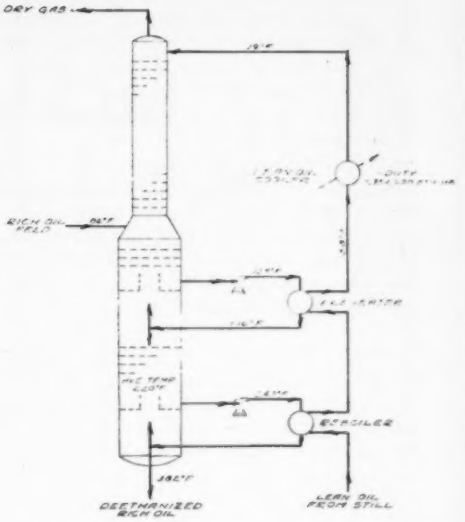



Fig. 4. Rich oil stabilizer—preheater and reboiler system. Patent pending to Refinery Maintenance Co.

the 4,100,000 BTU/Hr.

Second, in the case of the preheater-reboiler arrangement, the average stripping temperature is 220 degrees F., with a maximum temperature of 243 degrees F. The corresponding average temperature in the single-reboiler arrangement is 133 degrees F. with a maximum of 180 degrees F. Because of the higher mean temperature in the first case, stripping is more complete and can be accomplished with fewer trays and less reboiler vapor.

These two differences, the lower lean oil temperature to the cooler, and the higher mean temperature of stripping, give the preheater-reboiler system a definite economic and operating advantage over the single reboiler arrangement.

The system shown in Figure 3, which incorporates only preheating has very definite limitations as compared to the other two stabilizing systems. First, the degree of deethanization is entirely dependent upon the vapor used for stripping. If complete deethanization is required, it is necessary to recycle a stripping vapor essentially free of ethane. The vapor in this event would generally be propane from the top of the depropanizer column, which would increase the lean oil requirements in the top absorption section considerably to maintain the overall propane recovery. Second, if complete heat exchange between the rich oil and the hot lean oil is taken in the preheater, the amount of vapors generated is so great that a large heat exchanger section is required to prevent warming up of the bottom of the absorber section.

**Table I**

| Wet Gas Composition | Plant A | Plant B |
|---|---|---|
| Methane | 84.08 | 93.69 |
| Ethane | 7.28 | 3.63 |
| Propane | 5.40 | 1.54 |
| i-Butane | 0.62 | 0.27 |
| n-Butane | 1.57 | 0.42 |
| i-Pentane plus | 1.05 | 0.45 |
| Total | 100.00 | 100.00 |
| Liquid Content, i-Butane plus, G/M | 1.114 | 0.406 |
| Overall Propane Recovery, % | 40.7 | 80.2 |
| Propane Recovery in Rich Oil Stab., % | 87.5 | 92.0 |
| Propane Purity, Volume % | | |
| Ethane | 1.50 | 1.13 |
| Propane | 97.06 | 97.83 |
| i-Butane | 1.11 | 0.85 |
| n-Butane | 0.33 | 0.19 |
| Total | 100.00 | 100.00 |

An application in which the single-preheat system may be used advantageously is where only partial demethanization and deethanization are required. Such an application is sometimes found when high pressure absorbers are located on gas transmission lines. In these cases it is important that all of the gas except that used for fuel be returned to the transmission line at full pressure. Here a preheat of the rich oil leaving the absorber section of approximately 100 degrees F., with the injection of wet gas at the bottom of the stripping section, will result in the elimination at full absorber pressure of about 80 percent of the methane and ethane from the rich oil.

Single-stage reboiling has not been considered applicable for processing lean gases or for high propane recoveries[1]. On the other hand, the preheater-reboiler system has been found economical to install and operate over a wide range of feed gas compositions and propane recoveries. Our experience shows that it is not possible to set an upper economic limit on the propane recovery of preheater-reboiler stabilizers, nor when a wet gas would be considered too lean for this method of deethanization, as there are too many variables affecting each design.

Table No. 1 gives the feed gas analysis, overall propane recovery, and compositions of the wet gas and propane product, of two plants now in operation using preheater-reboiler rich oil stabilizers.

Although the propane purity given in Table I shows ethane contents between 1 and 1.5 percent, contents as low as 0.08 percent have been obtained.

The design of preheater-reboiler rich oil stabilizers is involved and to some extent empirical.

Figure 5 shows the essential stream compositions and quantities about an operating preheater-reboiler rich oil stabilizer. The first step in the design is to set the propane recovery and extent of ethane removal. An assumption of the lean oil quantity to the top of the absorption section makes it possible to complete a material balance around the tower, since all of the methane and none of the butanes will appear in the dry gas leaving overhead.

When design and operating experience is available, the assumption of lean oil quantity can be made quickly and accurately. A suggested method for computing the lean oil quantity[2] assumes equality of the ratios of the two key components in the feed and in the vapor to the absorption section. Our design and operating experience does not bear out either the assumption of the equality of the key component ratios or the suggested method of computing the lean oil.

With the material balance completed, the bottoms composition is known and an initial boiling point calculation will determine the bottoms temperature, once the tower pressure is set. At this point it is essential that the temperature level of the reboiling medium be considered, and that the bottoms temperature and pressure be far enough removed from the critical conditions of the deethanized material so that the required separation is possible.

The bottoms temperature calculation is a function of the characteristic of the lean oil. Depending on the particular set of "K" values chosen, differences of as much as 100 degrees in the calculated and observed values were found. An empirical correction for the lean oil "K" values may

be developed from operating data that is a function of the characteristics of the lean oil and the degree of stripping in the still.

The total heat input to the reboiler and preheater can be determined by an overall heat balance on the tower. It is impossible to generalize on the distribution of the heat between the preheater and the reboiler as each design must be studied from the standpoints of feed composition, propane recovery, temperature, and pressure. A recent article[3] states that it is usually not economical to put more than 30 percent of the heat into the preheater. We have not found any justification for such a statement. One plant now in operation takes approximately 60 percent of heat in the preheater, and the remaining 40 percent gives sufficient reboiler vapor to completely deethanize the rich oil. A fairly good approximation is, the richer the feed and higher the recovery, the more heat will be required at the reboiler.

With the amount of heat to the reboiler fixed, the bottom tray temperature is assumed. A heat balance around the bottom of the tower sets the amount of vapors to the bottom tray, which when added to the bottoms liquid gives the tray liquid composition. An initial boiling point calculation is made to check the bottom tray temperature assumption.

The top stripping tray liquid can be determined by tray to tray calculations over the stripping section. The point of methane injection into the tray calculations was originally approximated. When operating data became available, a method was devised to determine the amount and point of injection.

To determine the vapors rising to the absorption section, heat balances and flash calculations are made around the heat exchanger section. Knowing the dry gas composition and quantity from the overall material balance, and the assumed lean oil, this vapor can be checked with an absorption calculation.

If this check is reasonably close, the assumptions made in the course of the calculations were correct. If the composition does not check, new assumptions as to lean oil quantity, heat distribution between the preheater and reboiler, or number of trays, must be made and the calculations repeated.

Although the discussion has been limited to rich oil stabilization in gasoline plants, this process is, of course, equally applicable to refinery and cracking plant fat oils.

A plant nearing completion at Big Lake, Texas, will use a preheater-reboiler type of stablizer into which the wet gas will be fed directly without an initial absorber. Wherever absorption pressures will permit such a design, it will further reduce initial plant investment.

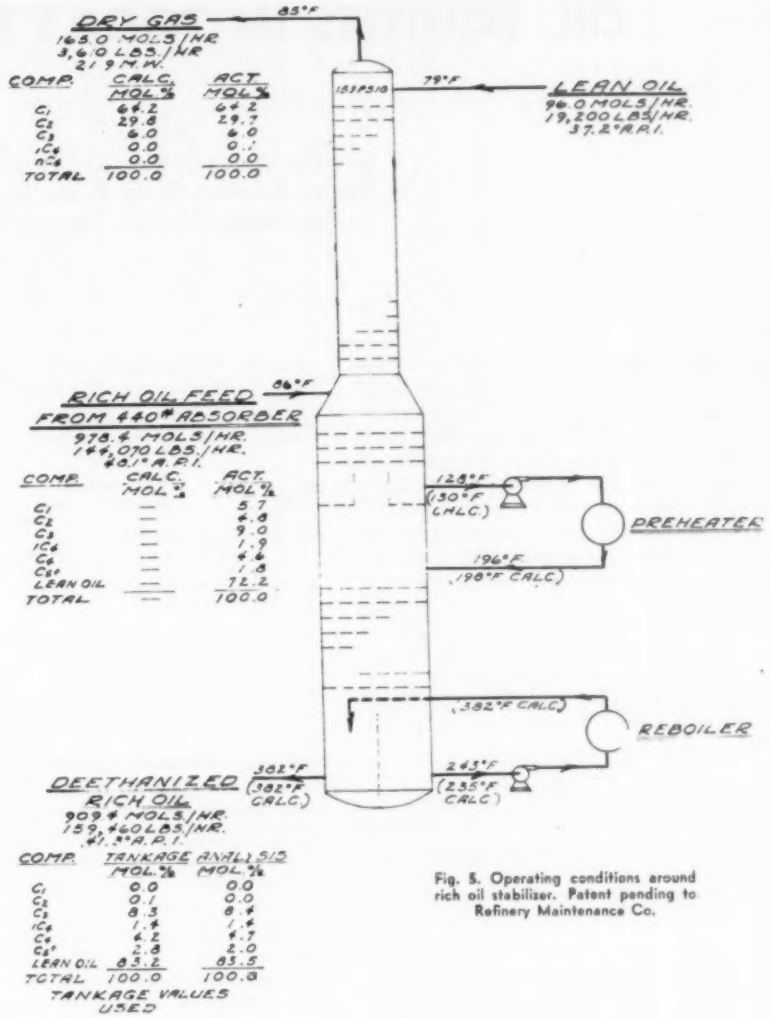
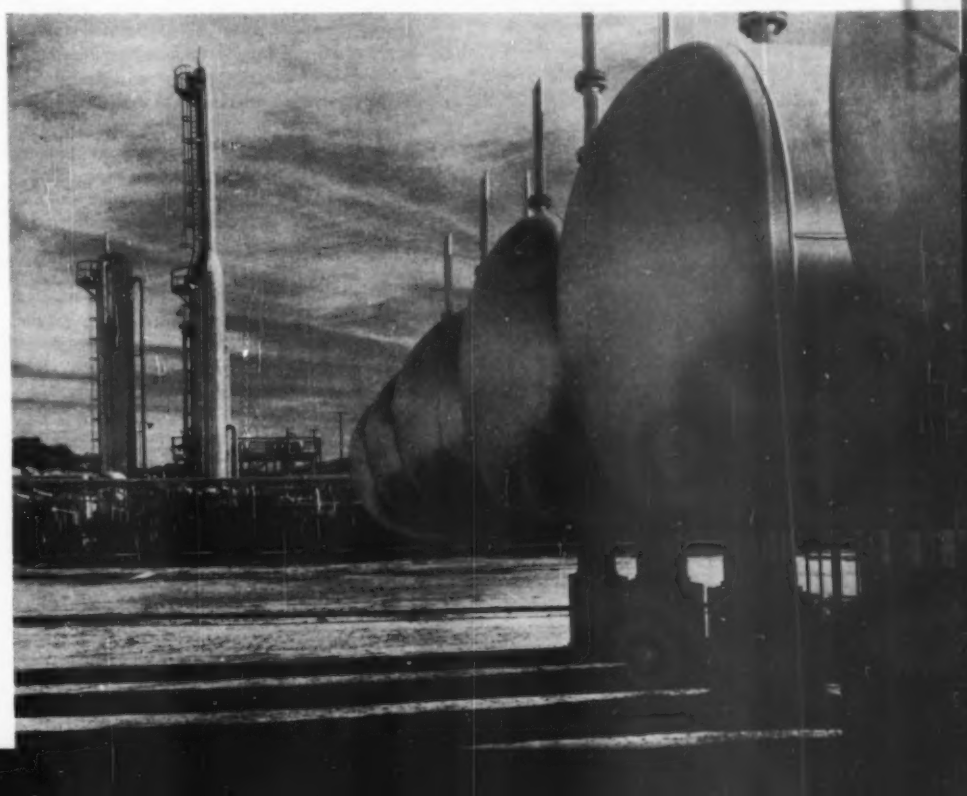



Fig. 5. Operating conditions around rich oil stabilizer. Patent pending to Refinery Maintenance Co.

Plant view showing high pressure absorber at left, rich oil stabilizer in center and storage at right. Photos by Rod Yould.



[3] Whistler, A. M., Petroleum Refiner, Vol. 25, No. 12, December, 1946.
[3] Kniel, Ludwig, Petroleum Refiner, Vol. 27, No. 11, November, 1948.
[4] Hannah, J. C., Petroleum Refiner, Vol. 28, No. 8, August, 1949.

# OIL EQUITIES IN TODAY'S STOCK MARKET

## Investor Demand for Oil Company Shares Has Raised Relative Stock Prices in Recent Months As Estimates of Future Demand Have Improved

COMMON shares of oil companies have turned in a remarkable performance since the end of the war. No other major group of common stocks has shown such substantial general rise in prices on the stock exchanges during this period. It appears that the peak in this upward trend was reached, temporarily at least, in the summer of 1948, and a portion of the increase in prices has since been lost. The question today is whether the substantial relative gains made by oil shares compared to the general market will be maintained. The rise in market prices for shares of oil companies was matched by an exceptional improvement in earnings, and probably the future role of oil shares in the changing favoritism shown by investors will be determined largely by the course of oil company income.

The remarkable expansion in the demand for petroleum products following the war, resulting in a substantial increase in prices which had been held down while the conflict was under way, has been responsible for the excellent financial showing of the industry during this period. While the income of all corporations in 1948 was slightly more than double the average reported during the war years, the oil industry was able to more than triple its earnings over the same period. During the two years 1946 and 1947 crude oil prices rose from an average of approximately $1.25 per barrel to $2.65 per barrel. Corresponding advances naturally occurred in product prices. While costs were advancing, an increased proportion of the better prices for crude oil and oil products was carried through to net income.

Greatest gains in earnings, generally speaking, were shown by those companies which derive the major portion of their income from the production and sale of crude oil, and for some companies higher prices and expanding production increased earnings nearly four times. The companies which obtain the major part of their income from the refining of crude oil which they purchase did not show as favorable results as the producing companies. Nevertheless, their operations were highly successful and profits increased substantially, although apparently refining margins did not increase in the same ratio as crude oil prices. Fully integrated companies on the average fared better than refiners, but not so well as crude oil producers. The following is a comparison of profits of oil companies compared with total corporate profits of the country as a whole:

**Net Income**
(1943-1945 = 100)

| | 1946 | 1947 | 1948 |
|---|---|---|---|
| Total corporate profits after taxes | 140 | 191 | 212 |
| 10 Crude oil producers | 140 | 242 | 391 |
| 7 Refiners | 129 | 208 | 300 |
| 11 Integrated oil companies | 129 | 205 | 336 |
| Oil Companies combined | 130 | 210 | 332 |

During this period when oil companies were reporting large gains in earnings, common stocks of the companies were enjoying a bull market of their own. Prices of oil stocks rose more or less steadily from the end of 1946 to mid-1948, while the stock market generally was fluctuating within a fairly narrow range. The announcement of important new oil discoveries and, in some instances, only mediocre new fields resulted in active buying of the common stock of the discoverer, and it sometimes appeared that the price rise in stocks of individual companies placed a disproportionate immediate value upon the newly discovered oil reserves. The fact that the oil companies had to utilize a very large proportion of their peak earnings for substantial capital expenditures, thereby greatly limiting dividend payments, did not seem to dampen the enthusiasm of buyers.

Market performance of oil stocks was not the same for all types of oil companies. Equities of crude oil producing companies and refiners were the most actively sought. These companies for the most part are smaller than the fully integrated companies and always have been the more speculative groups. They tend to lead in the advances and declines in prices for oil shares. The fully integrated organizations, the "blue chips" of the industry, were least affected by the bull market for oil stocks. Consequently they still remain the most reasonably priced based on past price ranges.

The peak of market strength in oil stocks coincided rather closely with the first appearance of weakness in the price structure of the oil industry. After the abrupt rise of approximately 18 months, the development of lower prices for heavy fuel oil, indicating that at least one oil product was no longer in short supply, resulted in selling, and prices of oil common stocks reached a low point early in 1949. Additional reasons for the decline in the popularity of oil shares were frequently supplied during this sell-off in oil securities. The continued downward trend in prices for heavy fuel oil and numerous price reductions for light fuel oils indicated that the supply of oil products was changing from a shortage to oversupply. The warm 1948-49 winter in the east was the last straw.

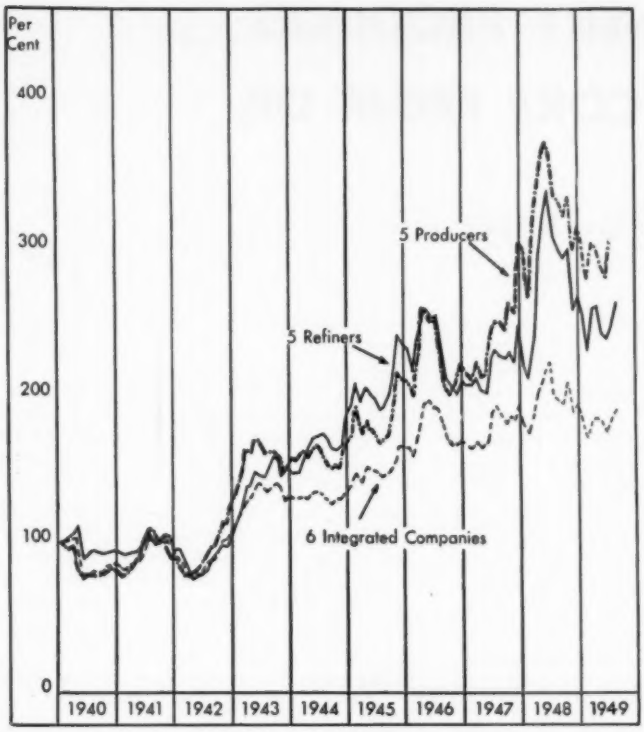
The unfavorable changes in the price structure in the oil industry were quickly reflected in reduced earnings for the oil companies. After two and one-half years of constantly increasing earnings, the oil companies began to show a decline in the trend of profits in mid-1948. By the beginning of 1949 the reversal in the trend of earnings become more noticeable. For the six months ended June 30, 1949, profits were down approximately 30 percent from the level existing in the first half of 1948. Statistics are not available for all corporations for the first half of 1949, but indications are that the decline in corporate earnings generally was considerably less than 30 percent compared with the comparable period of 1948. During the first quarter of 1949, total corporate profits were only 14 percent below the initial three months of last year. After leading the stock market for a year and a half, the oil industry proved to be one of the hardest hit by the current readjustment in the national economy.

Because oil companies benefited most from postwar trade growth, the recent 30-percent reduction in earnings still leaves profits on a relatively high level compared with prewar standards. If the present rate of earnings continues for the remainder of 1949, total profits of the industry for the full year will still be above the 1947 level. It would appear that a further substantial decline in earnings would be necessary to disturb the present relative position of oil shares on the stock exchanges.

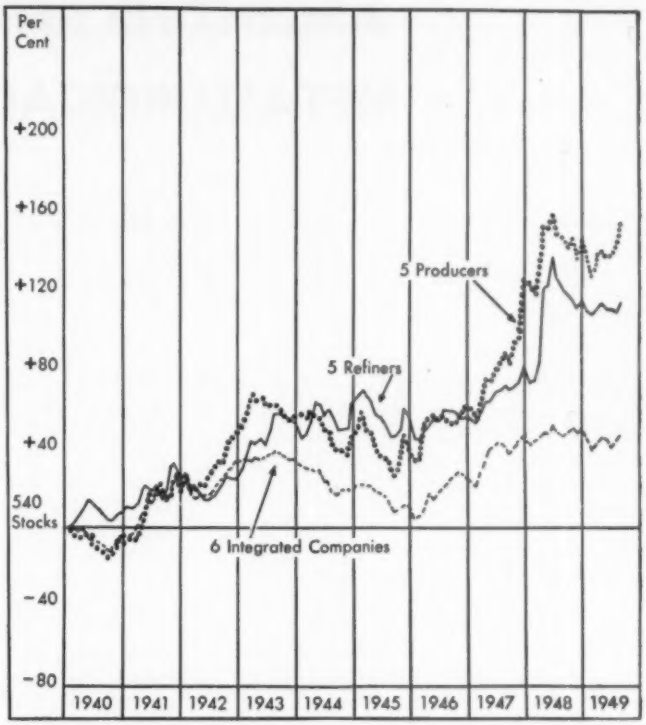
Lower prices for fuel oil did not completely dull the enthusiasm of the investing public for oil shares. As soon as cut-backs in crude oil production put a halt to the accumulation of inventories of oil products and the industry appeared to stabilize, the demand for oil securities was revived. A portion of the June 1948-January 1949 decline in prices was recovered. Shares of crude oil producers were most active and showed a rise of approximately 20 percent during the spring and summer, while refiners and fully integrated companies recovered about 10 and 15 percent respectively.

Some individual oil stocks did considerably better

This article was especially prepared for publication in World Petroleum by the Research and Statistical Department of Merrill Lynch, Pierce, Fenner and Beane, a member of the New York Stock Exchange —Editor.




In the past seven years the market value of United States oil company stocks listed on the New York Stock Exchange has risen sharply. The rise has been greatest in producing company stocks, particularly since the war although refining company stocks also have risen more abruptly than those of integrated companies engaged in all branches of the industry. Peak in the investor's evaluation of oil stocks was reached in June 1948, after which there was a decline through February, 1949. Since June the trend has been upward again as demand estimates have improved. (See Index Table below.)




The rise in oil company stocks in recent years as indicated in Figure 1 has been much greater than the rise in stocks of other companies listed on the New York Stock Exchange. The above chart shows the relationship of prices of producers, refiners and integrated companies to those of 540 other stocks. At the end of August the increase in the value of producer stocks in the past ten years was 153.5 percent of the increase in general stocks; refining company stocks rose twice as fast as general stocks and integrated companies 43.4 percent more than general stocks.

than these averages. As the industry appeared to stabilize and a cut in the price of crude oil no longer appeared imminent, there was a renewal of interest in oil stocks on news of new wells and merger possibilities. However, the response to such news in terms of price appreciation has been considerably subdued compared with the response during the earlier activity in oil shares. It is to be noted that some independent crude oil producers with properties located outside of Texas have been relatively unaffected by the readjustment in the industry.

Much of the recovery in market prices for oil equities occurred during the past summer. The revived demand for oil stocks appears to stem from the talk in some parts of the oil industry of the possibility of tightened supplies of fuel oil during the coming winter. Also greater weight has been given to these statements because of recent increases in prices for home heating oils. There has been some improvement also in the posted prices for heavy fuel oils. Whether or not the relative gain in prices of oil stocks will be retained depends upon the maintenance of better prices for such products and the realization of predictions that total demand for petroleum will increase more rapidly in the latter half of the year.

While there may be some improvement in the oil industry over the next few months, further readjustment is anticipated. Some investors have felt during recent months that the question was not whether the crude price would decline, but when. At the same time the improvement in demand which has made itself felt recently should tend to defer a change in this direction for the immediate future. Lower crude prices would logically be accompanied by reduced prices for oil products, and a lower price structure in the industry would mean a further decline in profits.

The factors which brought oil company securities into special favor during the past two years have become less influential during 1949, and oil stocks may be expected to move more in conformity with the general market. Petroleum, however, is more firmly established than ever before as a fundamental factor in industrial activity and progress. The use of oil products is certain to increase with the advance of world recovery, and the extensive research programs on which the industry is spending millions of dollars every year are constantly discovering new uses and developing new products. The common shares of well-established companies have come to be recognized as stable investments. The term oil stocks no longer connotes purely speculative undertakings, and oil company securities have a recognized position which undoubtedly will be maintained.

There has been some criticism of oil companies both for their relatively high earnings in the postwar period and for the small return that they have distributed to their stockholders. It is fortunate for the country, however, and for the long-term interests of shareholders as well, that the industry as a whole has been so prosperous. In no other way could it have brought about the expansion in the nation's known oil reserves and the enlargement of facilities necessary to keep pace with the growth in demand for its products. Of the billions that have gone into these works, a larger part represents the plowing in of earnings to meet future requirements.

**Indexes of Stock Prices**

(January 1940 = 100)

| | Dec. 31 1946 | June 30 1948 | % Increase | Feb. 28 1949 | % Decline | Aug. 26 1949 | % Increase |
|---|---|---|---|---|---|---|---|
| Crude Oil Producers | 222 | 370 | 66% | 273 | 26% | 324 | 19% |
| Refiners | 212 | 337 | 59 | 228 | 32 | 251 | 10 |
| Integrated Companies | 173 | 219 | 26 | 162 | 26 | 186 | 15 |
| 540 Stocks | 136 | 143 | 5 | 122 | 14 | 130 | 7 |

# ARGENTINE REFINERY PRODUCES METALLURGICAL COKE FROM OIL

By Manuel Rios* and Bernardo Rikles**

COMODORO RIVADAVIA, the first and most important Argentine oilfield, is located on the Gulf of San Jorge on the Atlantic seaboard at approximately 1,140 miles from one of the leading industrial and commercial centers of South America.

The maritime accessibility of the area together with the abundance of high-grade fuel at a low cost, such as the natural gas from Comodoro Rivadavia—which is practically sulfur-free—are favorable factors for the establishment of industries with a high specific consumption of fuel oil or with a view to process the raw materials that abound in surroundings.

Realizing the natural advantages of the area, Eng. Eduardo P. Senior, active manager of Ferrocarrilera de Petroleo[1] since 1934, who has been at Comodoro Rivadavia for the past 20 years, is making possible the life-long dream of many of the promoters of industrial development in Argentina. He has aroused the interest of several industrial companies in the erection of factories near Ferrocarrilera's refinery, which is located five miles from Comodoro Rivadavia, directly on the Atlantic coast. The refinery has been operating since 1925. As a result of his activities sometime ago, a washing plant for wool was installed with capacity to treat 1,500 tons of wool per year. Now a modern plant is being added for solvent and centrifugal extraction of lanolin. Until recently a plant owned by Duperial, S.A., processed 700 tons of calcium polysulfide. At present a zinc reduction and refining plant with capacity to process 12,000 tons per year of 88-percent purity concentrates is being installed, and foundations are being laid for the erection of a factory that will produce 120,000 tons of cement per year from raw material available in the area.

The zinc plant, owned by Cia. Minera Austral, which consists of Ferrocarrilera, Cia. Minera Aguilar S.A. and St. Joseph Lead Co., was confronted with the problem involved in the production of a metallurgical coke of the characteristics given in Table I, which is required for the thermoelectric furnace process of zinc reduction. The refinery with capacity to process 5,700 barrels per day of intermediate and asphaltic base crude oil from Comodoro Rivadavia, is equipped with a viscosity breaker unit adequate for treating 3,000 barrels per day of a residue of the characteristics given in Table V. This plant yields an average of eight tons per day of coke high in volatile content. By subjecting this petroleum coke to a controlled combustion in vertical furnaces designed and built by the company, Ferrocarrilera was able to produce during World War II a type of coke with a low content of volatile matter which was suitable for cast iron foundries. Processing losses were equal to 30-40 percent of the charge; thus the process was prohibitive from a standpoint of peacetime economy. Neither did the coke obtained conform to the specifications given in Table I.

At the beginning of 1947 Eng. Senior resolved to visit the United States, and after a careful study of plants designed for the commercial production of metallurgical coke in this country, he decided to acquire a battery of four Curran coke ovens, especially developed for the coke industry and used by North American refineries treating high asphaltic residue oils or with special interest in the production of a premium metallurgical coke. The battery of Curran coke ovens with a production capacity of 30 tons of metallurgical coke per day was completed in October 1948, and since that date it has operated successfully, yielding a product of the characteristics given in Table I.

Before proceeding with the discussion of the Curran coke plant, we will give a general idea of the treatment received by the crude oils described in Table IV, which constitute the raw material of the refinery. At this point it is interesting to know that since 1946 Ferrocarrilera has been processing crude oil produced by Astra Cia. Argentina de Petroleo in its Comodoro Rivadavia oil fields, delivering to Astra finished products ready to be marketed.

The crude oil dehydrated at the Petreco plants that form part of the refinery is subjected to a temperature of 715°F in a topping plant with bubble columns which make possible the production of gasoline, kerosene and gas oil for diesel motors as finished products. The residue from this plant, with a density from 0.950 to 0.960 (15°C/4°C) runs to the vacuum distillation plant where it is subjected to a temperature of 780°F and an absolute pressure of 2.3 inches Hg., in the vaporation zone of a bubble column designed and built by Foster Wheeler. The cuts of lubricating oils are partly subjected to a subsequent running in order to produce the volume of oils required by the domestic market, and the remainder is sent to Cia. General de Safaltos which obtains from this raw material about 7,500 barrels per month of lube oils, which are distributed by several dealers in oil products throughout the country.

The residue from the vacuum distillation plant with the general characteristics given in Table II, is used as charge to the viscosity breaker, where it is subjected to a temperature of 900°F and a pressure of 40 psi. During this operation the following products are obtained: nine percent of gasoline, density of 0.745; 21 percent gas oil, density of 0.850, which is used as charge to the Kellogg cracking units; one percent coke and three percent gas and losses; and 69 percent fuel oil, density of 1.035, which serves as charge to the Curran metallurgical coke plant.

The accompanying flow diagram gives a general idea of the principal characteristics of the installation. The main part consists of the cracking furnaces or chambers, each of rectangular shape and arched roof, and measuring 32 feet, three inches long by 10 feet, 1¾ inches wide. The distance between the arch and the floor is five feet at the center and two feet 10¾ inches at the

**Table I**

**Specifications of the coke for the zinc reduction and refining plant designed by the St. Joseph Lead Company:**

| | |
|---|---|
| Actual Specific Weight | Over 2 |
| Volatiles 7 min at 700°C | 3% |
| Sulfur—maximum | 0.7% |
| Ashes | 3% |
| Calorific value | 7,900 Cal./Kg. |

**Table II**

**Charactertistics of the charge to the viscosity breaker.**

| | | |
|---|---|---|
| Density (15°C/4°C) | 0.967 | (ASTM D-287-39) |
| Melting Point | 40°C | (ASTM D- 36-26) |
| Ductility | 50cms. | (ASTM D-113-39) |
| Conradson carbon residue | 16% | (ASTM D-189-39) |
| Solubility in $CS_2$ | 99% | (ASTM D-165-27) |

**Table III**

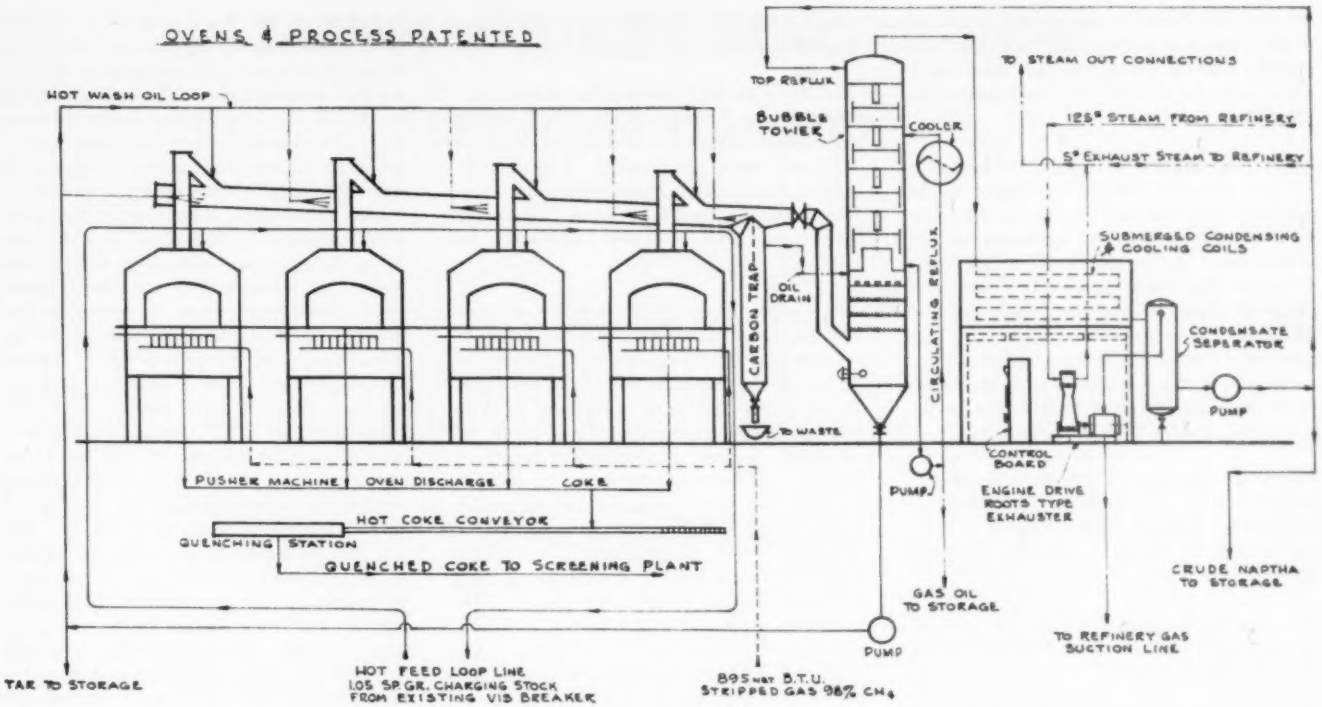
**Characteristics of the metallurgical coke obtained in Curran ovens of Ferrocarrilera de Petroleo.**

| | |
|---|---|
| Actual specific weight | 1.43 |
| Apparent specific weight | 0.86 |
| Bulk specific weight (bulk density) | 0.50 |
| Porosity in volume | 40% |
| Porosity in weight | 50.8 % |
| Ashes | 3.9 % |
| Volatiles—7 min at 900°C | 4.05% |
| Sulfur | under 0.5 % |
| Color | steel gray |

* Chief of Ferrocarrilera's refinery at Comodoro Rivadavia.

** Consulting Engineer in oil matters.

[1] Since 1948 when the government took over the British railroads, this organization has been subordinated to the Ministry of Transportation.




Flow diagram of Curran ovens and viscosity breaker at Ferrocarrilera refinery.

sides. These chambers are built with refractory bricks and include a large number of expansion joints so as to absorb the movements caused by expansion produced as a result of high operating temperatures. The entire assembly is enclosed with a metal structure, and all parts exposed to the atmosphere with the exception of the doors are protected by the steel casing.

The heat required for the operation is supplied from the floor by two sets of burners placed at both ends of the furnaces. The burners operate on alternate firing using natural gas as fuel. For an adequate distribution of heat, each chamber is provided with nine rectangular flues beneath the oven floor which are parallel to the long axis of the furnace. The gases of combustion are circulated by forced draft toward the stack through flues located under the floor channels.

The brickwork is supported by a structure of reinforced concrete which serves also as foundation for the entire furnace. Between this structure and the flues are conduits for preheating the air which is forced by a blower operated by a 2.5 hp electric motor and sent to the combustion zone at both ends of each oven. This arrangement fulfils two purposes: cooling of the structure and preheating of combustion air.

A series of butterfly valves strategically located in the conduits of air and gases of combustion permit a uniform control of the temperature through-

**Table IV**

**Characteristics of Crude Oils Processed**

| | Crude from Ferrocarrilera | Crude from Astra Argentina |
|---|---|---|
| Density (15°C/4°C) | 0.940 | 0.905 |
| **Yield vol. % of dry crude** | | |
| Gasoline | 1.4 | 5.1 |
| Kerosene | 3.5 | 7.1 |
| Gas Oil | 18.6 | 22.2 |
| Lube Cut[1] | 20.5 | 20.8 |
| Residue[2] | 55.5 | 44.1 |

[1] Obtained by vacuum distillation of the residue. A Claissen flask is used with 325°C in the liquid and an absolute pressure of 0.5 mm Hg.

[2] Melting point of the residue (ASTM-D-36-26) 38°C.

**Table V**

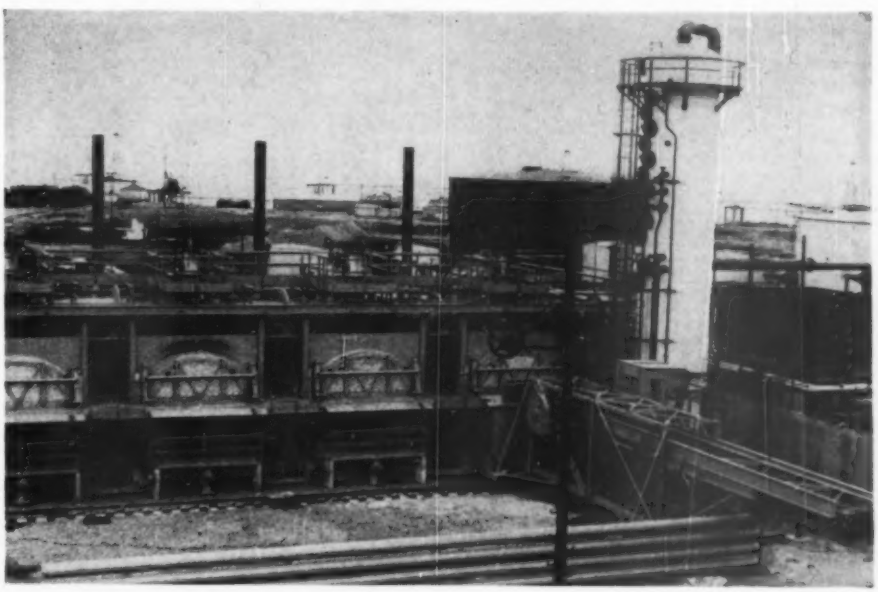
**Characteristics of the Viscosity Breaker Residue Used as Charge to the Curran Plant**

| | | |
|---|---|---|
| Density (15°C/4°C) | 1.035 | |
| Conradson carbon residue | 25.4% | (ASTM D-189-39 ) |
| Ashes | 0.9% | (ASTM D-482-38T) |
| Insluble in $CS_2$ | 5.9% | |
| Insolubles in $CCl_4$ | 12.1% | |
| Melting Point (Max.) A&B | 37°C | (ASTM D- 36-26 ) |

**Coke Distillation in Retort:**

| | |
|---|---|
| Total distillate | 31.2% |
| Coke | 60.2% |

Pusher side of ovens showing overhead tower and condensers.



out the floor. Thus the coking of the residue fed to the furnaces is uniform, and it is possible to prevent wide changes in the floor temperature which might be harmful and would shorten the life of the units.

Every thirty minutes the firing of the burners is reversed from one side of the furnace to the other, and simultaneously the position of the butterfly valves in the flues and heating air conduits changes also. As the temperature in the lower part of the floor tiles is about 2,000°F, there is no danger of accumulation of gases which might result in an explosive mixture. The changes indicated are automatically obtained with the use of a special reversing machine operated by electric power, which transmits the movements to the corresponding valves through steel cables.

In the event there is some difficulty in the electric system, the time of reversal may be changed at will by regulating the above-mentioned mechanism by hand and without interrupting the operation of the furnace.

The carborundum tiles that form the floors of the furnaces have given satisfactory results during the operations up to date.

The doors of the chambers for coke extraction are built of steel framework and refractory bricks. In order to prevent the infiltration of cool air, a special paste made with refractory clay and pulverized coke is spread around each door. A steel door hoist running on an iron structure located at each side and along the upper part of the battery of units and operated by a five-hp electric motor is used to lift the doors whenever it is necessary to remove the coke. The gases and vapors produced during the coking process are carried to a bubble column nine feet, two inches in diameter by 42½ feet high through a line three feet in diameter, which is connected to each one of the four furnaces by means of steel gate valves one foot, three inches in diameter.

The charge to the furnaces is fed through four two-inch inlets located at a distance of one foot three inches from the floor of each furnace and along each side of the chamber. A constant circulation is maintained through the main charge line in order to avoid temperature drop as well as the formation of coke that may obstruct the line.

The gases and vapors of the system are extracted by means of a Connorsville blower belt driven by a steam engine. To expedite the extraction of gas and at the same time prevent the infiltration of cool air, the operation is regulated so as to maintain almost an atmospheric pressure in the chambers. This is achieved by the use of six Askania regulators with hydraulic transmission. Four of these regulators operate directly on the outlet valves of each one of the furnaces; the fifth one controls the position of the butterfly valve in the vapor line, while the sixth regulates the inlet valve on the exhauster engine. This control system has proved to be highly satisfactory for maintaining the desired pressure in the chambers. As an auxiliary element for vapor extraction, a steam ejector is available which is mainly used for starting the battery of Curran coking units.

On account of the properties of the charge and the gases formed during the operation, certain precautions are taken to prevent the cracking of the former and the formation of coke in the line due to high operating temperatures. A system for the injection of gas oil at 490°F is connected to the vapor outlet of each chamber and to several points in the vapor line that connects to the bubble tower.

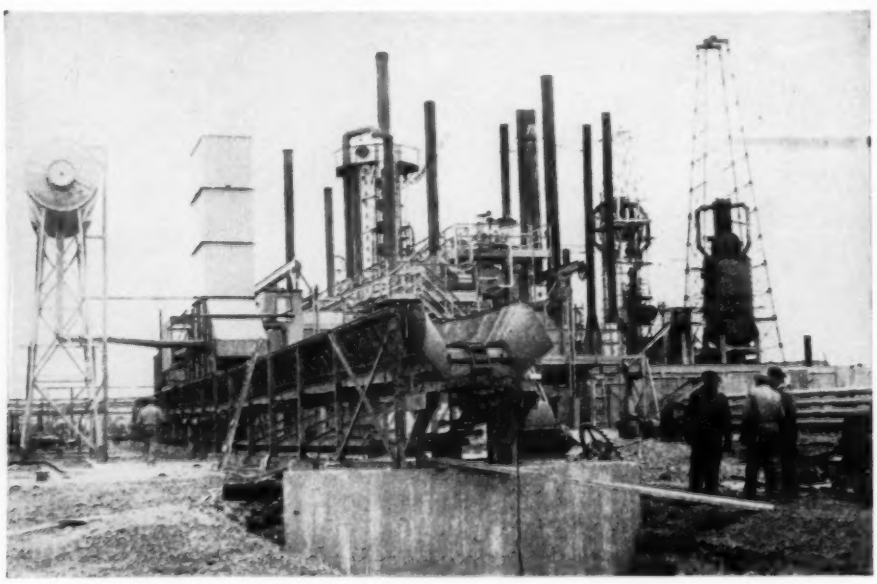
The first step during the cycle of operation is the sealing of the floor for a period of 15 minutes. The purpose of the sealing practice is to cover the cracks between the carborundum tiles that form the floor of each chamber. The floor is preheated to 1,650°F and the connecting valve of the chamber to the vapor line is kept in a closed position, while the exhaust valve to the atmosphere remains opened. Once the desired temperature is reached, the charge is fed during the time stipulated, forming a thin layer of coke over the floor. When the sealing is completed, the exhaust valve is closed and the valve of the vapor line is opened while the feeding continues. As a result the temperature of the chamber drops from 1,650°F required for a sealing operation to 975°F. During the charge injection which requires a period of 4½ hours, the operating temperature remains between 975°F and 985°F, which has proved to be most adequate for the product yielded by Ferrocarrilera. At the end of this period of 4½ hours the feeding is discontinued and the "drying" of the coke deposited in the chamber takes place. The time required for drying depends on the thickness of the layer of coke—usually from one and a half to two hours. The temperature of the chamber increases once more during this operation, and when it reaches a level of 1,300°F, the drying process is interrupted, the furnace is disconnected from the circuit, the doors are lifted, and the finished coke is removed.

The coke is removed from each chamber by means of a sliding ram formed by two smooth-faced beams which push the coke out of the chamber. The sliding ram forms part of a pusher machine on rails which run the full length of and parallel to the side of the battery of ovens. The machine is powered by a 20-hp electric motor through a system of gear and rack. Another motor moves the mechanism along the rails so that it may be located in front of any desired chamber.

The carbon at approximately 1,600°F is pushed through the opposite door into a metallic conveyor 130 feet long, and as it moves along on this conveyor receives a shower of sweet water which cools it enough to be unloaded on trucks at the end of the carrier. Due to the lack of sweet water in Comodoro Rivadavia and the need to obtain the water supply from aqueducts several miles long, the cooling water is collected in a basin and pumped back to an elevated storage tank from where is it recirculated for the quenching process.

The Curran coke plant, which has been in constant operation during ten months, has produced an average of 30 tons per day of metallurgical coke of the characteristics mentioned in Table III, requiring only seven men per shift as an independent unit of the refinery.

Coke conveyor and quenching station.



**Yields Obtained in the Curran Coke Plant of Ferrocarrilera de Petroleo**

| Yield | Percent |
|---|---|
| Distillate | 56.5[1] |
| Coke | 19.5 |
| Noncondensable gases | 24.0 |

[1] From this distillate the following products are obtained in the bubble tower: 14.7 percent heavy gasoline and 41.8 percent light residue which is sold as fuel oil or used to reduce the viscosity of the residual fuel oil produced in the refinery.

# LEASING ACTIVITY REACHES HIGH LEVEL IN DAKOTA

By Alton G. Sorlie

SINCE early in the year North Dakota has been subjected to an invasion which has spread over a good part of the state but has centered more or less here in the capital, a natural headquarters. The influx is a peaceful one made up of oil scouts, lease hounds, geologists, would-be investors and plain adventurers. An estimated 9,000,000 acres, more than a sixth of the state's total area, is under lease in one form or another. Leasing has been concentrated in the central and western sections where some counties are blanketed 90 percent with leases. Reservations are not confined to this region, however, as widespread leasing has been reported in northeastern and southeastern counties and in fact has spread to areas beyond the state boundaries.

More than a score of large oil companies and a much greater number of small ones and individual operators are represented here in the state, looking over the situation, and most of them have picked up leases. The procession of oil hunters was led by Continental Oil Company whose representatives began moving into the state early in the year, almost as soon as the snow melted and roads became passable. They were soon followed by scouts of Carter Oil Company, the California Company, Lion and Magnolia. Later on Amerada, Shell, Stanolind, The Texas Company and Sohio joined the parade as well as smaller operators, land leasers and mineral deeds buyers.

Most of the large companies operate in the same manner, offering land owners an annual rental of 10 cents per acre, a bonus of 10 cents an acre and a one-eighth royalty on any gas or oil that may be produced. As a rule leases run for a period of ten years. Rights issued by the state cost lessors more, although the lands they cover presumably have no greater potentialities as oil producers than those under private ownership. In 1939 the North Dakota legislature passed a law which requires a minimum rental of 25 cents an acre yearly on state lands leased for mineral exploitation or development. Along with this is a 50 percent reservation on mineral rights on land sold by the state after 1941.

As a result an oil company acquiring rights on land sold by the state within the past eight years signs a separate lease with the state, giving it a 12½-cent per acre annual rental and one-sixteenth of whatever oil or gas is produced. Hundreds of North Dakotans have accepted $50 payments per quarter section of their land, selling outright their interest in any mineral deposits that may be discovered.

A third method of leasing favored by many independent operators consists of renting the entire holding of the landowner for the first year for a fee not exceeding the 10-cents per acre price. The lease usually is for an optional ten-year period with the usual royalty provision. For each year after the first that the operator renews his lease, he agrees to pay one dollar per acre, but he is not required to renew.

As a result of all this activity the office of the State Treasurer has been kept extremely busy, and its coffers have benefited as an estimated eight percent of the leases recorded have been made with the state's school lands department and the state bank.

The present keen interest in North Dakota and neighboring states has been stimulated by the remarkably rich discoveries in Devonian formations just to the north in Alberta, Canada. Reports from that province indicate that the oil beds pinch out on a great igneous pre-Cambrian shield that extends south of the Canadian border and parallels the Minnesota-North Dakota boundaries with numerous sedimentary beds in central North Dakota that resemble the northerly formations.

According to Alfred M. Fruh, associate of geologist Thomas W. Leach, who for the past 25 years has been active in the search for oil in this area, the indications are that back in the Cambrian era the ocean covered parts of the state during long periods, depositing sediments such as have been found to result in oil production. Occasionally these seas withdrew to the extent that erosion might have occurred, or they became restricted to local areas. From the Cambrian through the Mississippian period most of the characteristic rocks are represented in sections of North Dakota. From the Mississippian to the end of the Palezoic era, the seas were much more restricted and rocks belonging to the era are present only in the extreme southwestern part of the state. Following the Palezoic period, a period of erosion occurred, after which seas of the Mesozoic era encroached upon the area. Deposition in these seas continued with periodic interruption, resulting in the marine accumulations necessary for the formation of oil.

The next requisite to the accumulation of oil, Mr. Fruh says, is to have reservoir zones present. Exploration in the area has indicated that such zones exist in the strata. Locations of these traps where oil and gas are accumulated and can be produced when tapped is the problem now facing oil hunters in the state.

As far back as 1927 the first bid for oil was made in North Dakota when Herman Hanson sank an 1800-foot well in McLean County near Turtle Lake. This pioneer found no oil, but his two sons, in conjunction with oil interests, are promoting a new test well near the old derrick which is still standing. In the years just preceding the late war, between 1938 and 1942, there was a flurry of leasing for oil exploration, and several wells were drilled without finding commercial production though it was reported that two of these found oil showings at depths around 6,800 feet.

At the present time four separate companies are seeking at least a partial answer to the question of oil through the drilling of test wells. The Continental and Pure Oil companies have reportedly reached a depth of 5,000 feet in a stratigraphic test 13 miles north of McKenzie in Burleigh County. Drilling of the first of a series of stratigraphic test holes in Ramsey County has begun four miles south of Hampden in the north-central part of the state. The test is being made by the Union Oil Co. of California. Drilling is also being resumed at 6,540 feet at the independent Carpio well northwest of Minot in the central part of the state by the Price Drilling Co. Another test near the first dry hole sunk recently near Lyleton, Man., almost due north of Minot, is reported to be down about 4,000 feet. The first hole was sunk there by the Souris Valley Oil Co. to a depth of 5,160 feet and abandoned dry.

Other exploratory activities are planned which should determine in the not-too-distant future whether or not North Dakota is to be added to the list of oil-producing states.

# HYPERMATIC . . .

# A NEW TYPE AUTOMATIC LUBRICANT

A NEW development in the lubrication of pressurized plug valves on lines carrying oil, water, gas, chemicals and slurries has been brought out by the Nordstrom Valve Division of Rockwell Manufacturing Company. It is claimed for the new system, which has been christened Hypermatic, that it does not require the use of mechanical force-feed devices and that for the first time a compound has been created which is both compressible and expansible and embodies dynamic properties wherein energy may be stored for prolonged periods to give automaticity to its feeding action.

Lubrication cost of pressurized valves may be cut from 20 to as much as 90 percent, and valves will be maintained at a higher peak of efficiency when Hypermatic is used, according to George F. Scherer, director of research of the Nordstrom organization, creator of the lubricant.

Thousands of manhours were invested in the Oakland laboratory in proving and disproving established lubrication theories and compounding specialized lubricants before the self-sealing Hypermatic was born.

Textbooks on physics and hydraulics state that for all practical purposes water and oil are incompressible within a confined space. Defying the physical laws based on this assumption, Hypermatic may be compressed, thus creating an "energized" condition which the manufacturers claim will automatically feed lubricant to seal seating surfaces and fill voids in event of a leak. The material retains its energy for an almost limitless number of valve turnings and may be reenergized when the pressure finally subsides by simply adding more of the same substance to refill the valve chambers or by turning the lubricating screw to recreate stored energy.

Hypermatic was primarily perfected to provide automatic lubrication for pressurized plug valves, but indications are that it may have applications in other fields. To date tests have been confined to valves, but further investigation may reveal other uses. Field tests on valves have been in progress for months and have proved the success of the energizable lubricant under most conditions in a temperature range of 250°F. Applications to lines of higher temperature may become available after completion of further tests.

Performance of Hypermatic in a closed reservoir may be compared to the action of a tank of compressed air which, by reason of its compression, has stored within itself sufficient energy to permit intermittent or continuous work to be done as the air is bled off into all types of mechanical devices such as paint spray guns, air motors, hoists and rivet guns. Hypermatic, compressed to a similarly energized condition within a valve chamber, performs the work of renewing the lubricant sealing surfaces.

Another simple analogy is in the action of an automatic door check, in which sufficient energy is impounded within the check when the door is opened to close the door automatically when it is released. Compressing Hypermatic in the valve may be compared to opening the door, while the continuous valve lubrication is analogous to automatic door closing.

Compared with a standard lubricant which is incompressible and maintains pressure within the valve only for a short time, Hypermatic continues to exert pressure to fill lubrication voids until the confined pressure drops to a minimum of 50 pounds. The time during which the valve maintains 100 percent automatic lubrication without repressurization depends upon the number of valve closures and the amount of lubricant stored within the valve. Full automatic lubrication may be restored simply by adding more Hypermatic either by insertion of the material in stick form or by a high-pressure grease gun.

The self-acting lubricant is held in its energized condition between the valve sealing surfaces and the ball check valve in the steam of the valve. Should the valve be neglected over a long period of usage and the energy of the Hypermatic lubricant become dissipated, the material simply reverts to the status of a non-automatic lubricant.

The usual concept of automatic lubrication conjures the use of some sort of mechanical contrivance which injects lubricant from an external reservoir into the valve. This type of lubrication injection requires not only a large capital investment but is considered impracticable for most valve installations.

So a challenge was set: How could automatic lubrication be achieved without some mechanical contrivance operating outside the valve? Thinking inversely, it was decided that if a valve lubricant itself could be self-energized, fully automatic lubrication might become a reality. The goal was achieved by creating a plastic lubricant with both compressible and expansible characteristics and combining dynamic properties to maintain an energized status.

The manufacturer claims that the users of pressurized plug valves may derive three distinct advantages from Hypermatic automatic lubrication: (1) decreasing the frequency of valve lubrication; (2) keeping the valves in a state of 100 percent lubrication, and (3) maintaining the valves in operable condition without first stopping to re-lubricate the valve.

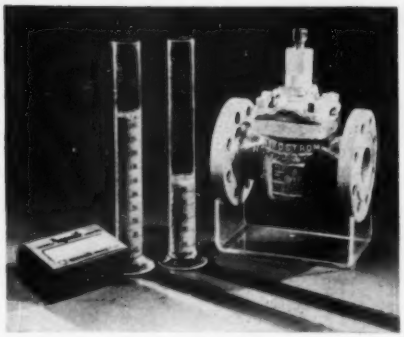
With more than 5,000,000 lubricated valves of the Nordstrom type in service, the savings in manhours over a 10-year period assume tremendous proportions. Every valve of any design, whether gate, globe or plug, requires regular attention to give its best performance. For example, up until now the usual servicing of a Nordstrom valve consisted of inserting a few sticks of lubricant on a schedule consistent with the frequency of turning, types of service, size of valve and line content. Assuming that the average valve of any type requires an average attention of perhaps two hours per year to inspect, check, re-lubricate or service, a total of ten million manhours is computed each year for five million valves.

With the availability of an automatic lubricant, frequency of lubrication may be reduced to 1/10, 1/20, 1/50 or 1/100 of previous time. Automatically lubricated valves should require less attention, less inspection and only a fraction of their previous servicing. A conservative estimate of savings in manhours of line service, if predicated on a saving of 50 percent, would total 50,000,000 manhours in ten years.

Valves are expected to consume less lubricant because Hypermatic should maintain a better equilibrium of pressure, avoiding over-lubrication by inexperienced attendants. Valve life expectancy may also be extended which would reflect additional savings.

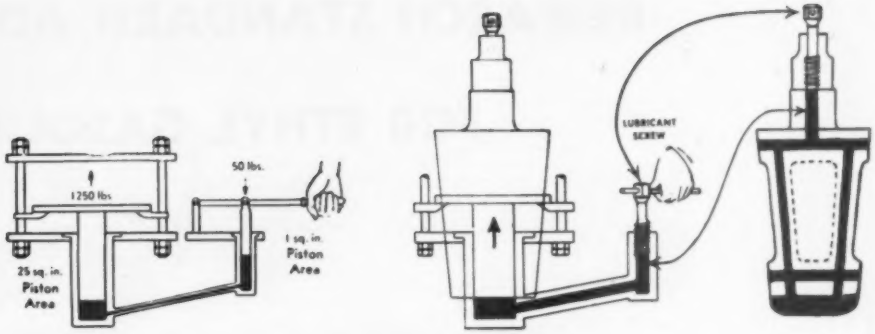
Basically Hypermatic is similar to standard, non-compressible materials in its lubricating properties and wetting action. It is available in stick or bulk, the same as standard valve lubricants. The main difference between Hypermatic and non-automatic types is in its intrapowered action under working conditions. Hypermatic flows into voids and maintains an unbroken film surface. When it comes to rest, as when the valve turning is complete or any void is filled, it again assumes its plastic form with all lubricated surfaces perfectly sealed.

The performance could be duplicated to some extent with standard, non-compressible lubricant, provided the lubricant screw was turned or some other physical means were used to keep pressure on the lubricant while the valve was being turned. Since Hypermatic is self-energized, this complete lubrication is entirely automatic over a great number of valve closures.



VALVE CAPACITY

Beaker next to box shows volume of Hypermatic automatic lubricant storable; the beaker next to valve shows volume of non-compressible, non-automatic lubricant storable.



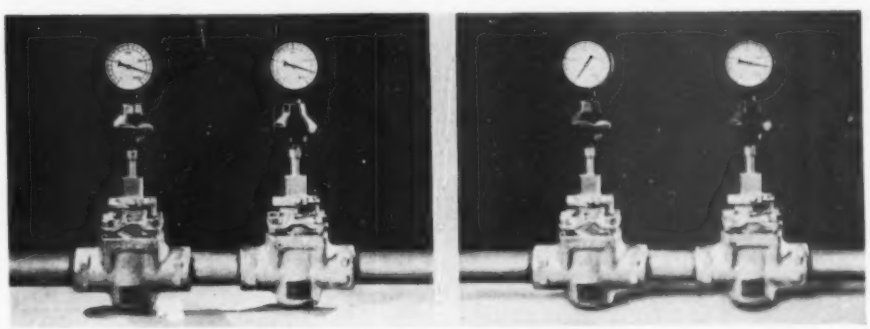

PRESSURIZED LUBRICATION

Pascal's law of fluid dynamics as related to plug valves of the pressurized type states "pressure applied to a confined fluid is transmitted uniformly to all areas of the confining surface."

Due to its inherent nature, a greater volume of Hypermatic may be added to the valve storage reservoir than in the case of standard lubricant. Unlike the reaction of standard non-automatic lubricants, pressure within the valve is built up as Hypermatic absorbs energy. It impounds power likened to billions of pent-up springs compressed with power, each spring ready to push lubricant forward into any void that may occur.

An inquisitive reader might well ask, "Will Hypermatic feed into the line since it is continually under pressure?" Or, "Does the lubricant pressure have to be high or higher than the line pressure?" The answer to both questions is "No," since the physical properties of Hypermatic are such that they permit easy flow through the provided lubricant channels, but when spread out in a thin sealing film between the valve seating surfaces, the lubricant resists replacement. Hypermatic continues to replenish lubricant to the sealing surfaces even when the lubricant pressure falls far below the line pressure. For example, if a leak of line fluid inside the valve were to develop, a pressure gradient along the path of leakage would exist with the downstream exit pressure being substantially below the upstream pressure. This being the case, the pressure required to inject the lubricant into the path of the leakage would be approximately equal to the static pressure of the leakage stream at any point. Downstream, when the pressure is zero, it is evident that the lubricant pressure required to seal off the leak at this point would have to be only slightly higher than zero. For this reason Hypermatic stops leaks automatically, demonstrating its effectiveness in increasing valve efficiency.

Hypermatic lubricant may be used in all valves of the Nordstrom type to secure the benefits of automatic lubrication. Only the normal valve adjustments need be made to hold energized lubricant. It is unnecessary to purge the lubricant from valves already in use. The old lubricant is gradually forced out over a period of time. Automatic lubrication is effective over the entire range of pressures that are recommended, including vacuum service.

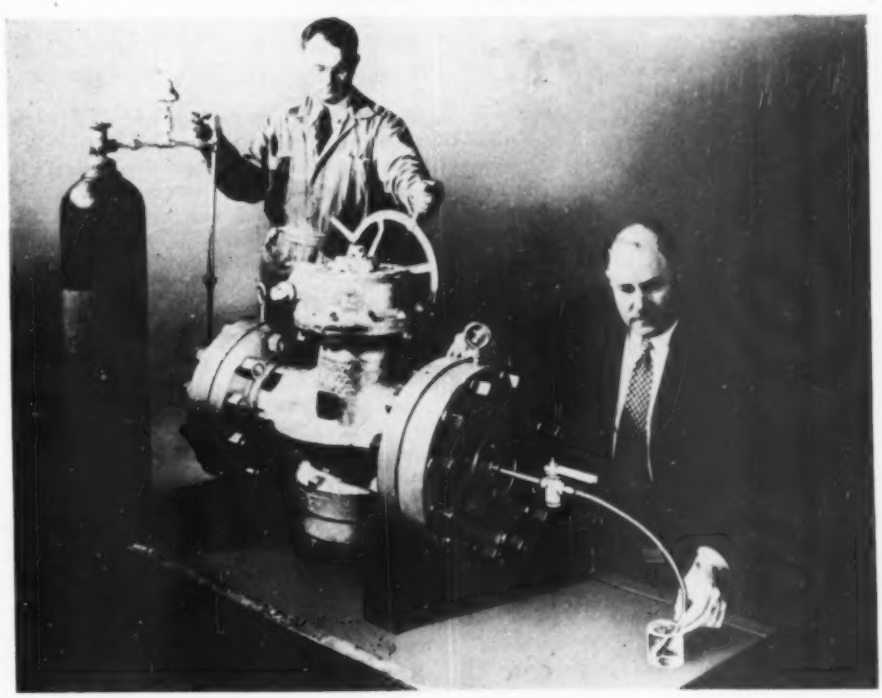


COMPARATIVE TESTS SHOWING PRESSURE RETENTION

At left, Valve (A) is pressurized at 350 psi with non-energized lubricant on a test line. Valve (B) of identical type is pressurized to 350 psi with automatic energized lubricant. At right, six months later, Valve (A) pressure of non-energized lubricant has dropped to 0 psi. Valve (B) pressure of energized lubricant shows negligible decline.

Demonstrating Action of Hypermatic in a Plug Valve.

Seated: George F. Scherer;
Standing: B. A. Perkins.



# RESEARCH STANDARD ADOPTED FOR ETHYL GASOLINE

EFFECTIVE September 20 a minimum standard of 86 octane number by the Research method was established for gasoline sold under the Ethyl trademark. Adoption of the Research method as the basis for setting the antiknock quality of this premium gasoline is expected to give new impetus to the use of that laboratory knock-testing method.

Use of the Research method as the basis for Ethyl gasoline replaces the older Motor method of test. While setting a minimum standard of 86 octane number Research for the country at large, the new specifications make an exception for areas of higher altitudes, where cars have somewhat lower octane requirements. Accordingly a standard of 83 octane number (Research method) has been set for the states of Montana, Idaho, Wyoming, Nevada, Utah, Colorado and New Mexico, and the extreme western sections of Oklahoma and Texas. This area averages considerably above 3,000 feet in altitude with no abrupt change to lower elevations.

Preliminary reports to Ethyl Corporation indicate that the great majority of refiners will have no difficulty in meeting the new specifications for Ethyl gasoline. In fact the corporation points out that the nationwide average of Research octane numbers of premium gasoline has met these minimum specifications this year. In recent months, it states, the average octane number of premium gasoline being sold to motorists has been 88 Research and higher.

The decision to adopt Research ratings, it is explained, was made after careful study and in the light of postwar trends. In particular the new standard is designed to reflect the way the newer models tend to rate fuels on the road and the generally high level of antiknock quality required to satisfy the cars now in operation.

While the newer refining processes have resulted in some increase in motor octane numbers, the better road performance of these gasolines is more nearly reflected by the improvement in their Research octane numbers. Most premium fuels now have Research ratings in the range of 86 to 90 octane number or higher.

Moreover, road ratings of fuels obtained on cars having newly designed engines show a close correlation with laboratory ratings secured by the Research method. It is significant that a number of automobile manufacturers now express the fuel requirements of their new models in terms of Research octane numbers and use the Research method for refinery control and marketing purposes.

The adoption of Research method ratings, therefore, represents another step in the evolution of knock-testing methods. Refiners need to have practical methods for determining the antiknock quality of their gasolines for two important reasons. They naturally want to market fuels that will give the best possible road performance for the greatest number of cars. They also need a day-to-day means of measuring and controlling the antiknock quality of the gasolines they are producing. Thus in the past 15 to 20 years there has been a continuing effort to obtain a close correlation between road and laboratory ratings.

The Motor method, which was adopted in 1933, was the first laboratory knock-test method to be generally used throughout the oil industry. Fuel ratings obtained by this method correlated well with the results of extensive road tests which had been held at Uniontown, Pa., in 1932.

The Motor method in its day served a highly useful purpose in broadening the understanding of fuel-and-engine relationships. Nevertheless, it was specifically designed to rate gasolines available in 1932 on the basis of their performance in cars in use in 1932. At time went on, a number of fuel technologists, felt it was becoming less and less valuable as the sole criterion of antiknock quality.

The reason for this growing conviction lay in the important trends which were meanwhile developing in fuels and engines. Engines were being produced with higher ccompression ratios and other features of design were undergoing change. The chemical composition of gasoline was beginning to change and become more varied. Accordingly a growing number of technologists began to question whether the Motor method was accurately reflecting the effects of these changes.

Finally, after some five years of extensive road and laboratory tests, the Coordinating Fuel Research Committee standardized a laboratory method which became known as the 1939 Research method. This new method was generally considered to be a valuable addition to the standard test procedures because the deviation from Motor method ratings exhibited by the knocking of the newer fuels in the cars then being produced was in the direction of ratings obtained by the Research method. Extensive road tests in 1940 and 1941 substantiated this trend. Since that time many refiners have come to use it in conjunction with the older Motor method as a means of obtaining a more comprehensive indication of the antiknock quality of fuels under a range of service conditions.

Numerous tests in the past decade of the road performance of gasoline, coupled with comparisons of their Motor and Research method ratings, have led to some broad conclusions. In general, if two gasolines have the same Motor octane number, the fuel having the higher Research rating will usually give the better road performance. However, if two fuels have the same Research octane number, the one having the higher Motor rating will usually give the best overall road performance. This results from the tendency of a certain percentage of cars to knock at high engine speeds, where engines tend to rate fuels more nearly in the order of their Motor method ratings.

Although the Research method of laboratory octane number determination has come to the fore as the most practical method for general use, this does not mean that it is ideal. On the contrary, it is generally recognized that there is no perfect test method nor is it likely that one will be developed in the near future. As new factors in engine operation and gasoline refining exert their influences on fuel knocking, it may be necessary to continue to revise knock-testing methods from time to time in order to give recognition to these additional variables. The goal is always that laboratory knock-testing methods reflect accurately as practically as possible the changing fuel requirements of automobiles.

### Trends in Octane Numbers of Premium and Regular Gasolines

**(Determined by Service Station Samples Tested by Ethyl Corporation Gasoline Testing Laboratories)**

**Average Octane Numbers—Premium Gasoline**

| | Research | | Motor | |
|---|---|---|---|---|
| | 1949 | 1948 | 1949 | 1948 |
| January | 86.8 | 86.6 | 79.8 | 79.4 |
| February | 87.0 | 86.7 | 79.9 | 79.8 |
| March | 87.1 | 86.4 | 79.9 | 79.9 |
| April | 87.4 | 86.4 | 80.0 | 79.9 |
| May | 87.9 | 86.5 | 80.2 | 79.8 |
| June | 88.1 | 86.5 | 80.4 | 79.6 |
| July | 88.2 | 86.4 | 80.5 | 79.5 |
| August | 88.5 | 86.2 | 80.6 | 79.5 |

**Average Octane Numbers—Regular Gasoline**

| | Research | | Motor | |
|---|---|---|---|---|
| | 1949 | 1948 | 1949 | 1948 |
| January | 81.3 | 80.0 | 76.1 | 75.6 |
| February | 81.6 | 80.8 | 76.3 | 75.9 |
| March | 81.8 | 80.8 | 76.5 | 75.9 |
| April | 81.8 | 81.0 | 76.5 | 76.0 |
| May | 82.0 | 81.0 | 76.6 | 76.0 |
| June | 82.3 | 81.0 | 76.8 | 75.8 |
| July | 82.3 | 81.1 | 76.7 | 75.8 |
| August | 82.4 | 80.9 | 76.7 | 75.8 |

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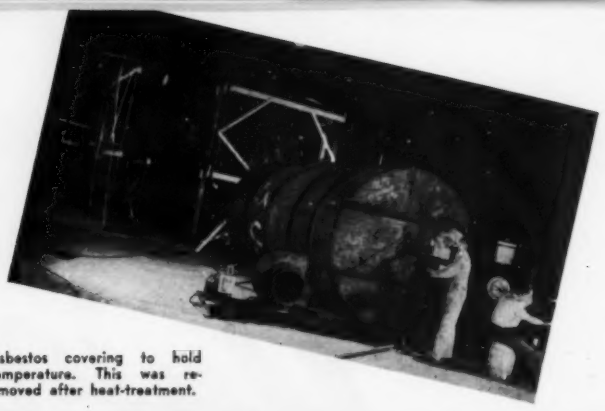
# TOO LARGE TO SHIP— SO IT HAD TO BE FLOATED



Asbestos covering to hold temperature. This was removed after heat-treatment.

Traversing city streets after midnight.

Picked up by a super-crane at waterside.

TO meet a special condition in the plant which it is erecting near Brownsville, Texas, Carthage Hydrocol, Inc., ordered a steel vessel 57 feet, eight inches in length, with an outside diameter of 17 feet and a weight of 284,000 pounds. Its wall thickness is three inches and the material used was carbon molybdenum ASTM A-204.

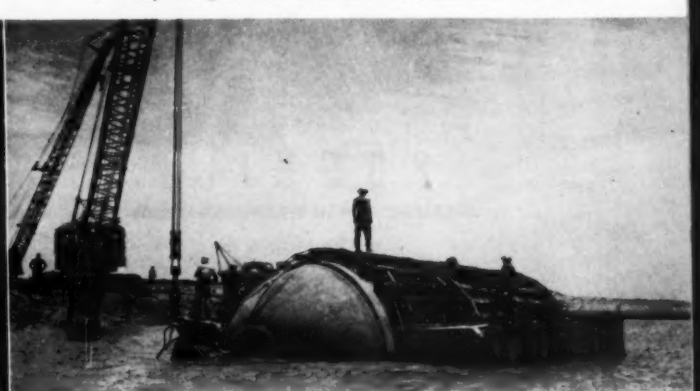
The vessel was fabricated by Wyatt Metal & Boiler Works at Houston, Texas. Since it was too large to go inside any available stress relieving furnace, a special furnace was built to stress relieve it by heat induction. A blower system, connected direct to the furnace, blew heat into the vessel over a period sufficient to build up 1,200 degrees of heat and hold this temperature for the required period. To facilitate this job, a "dress" of three-inch thick asbestos was put around the big vessel and removed after heat treatment.

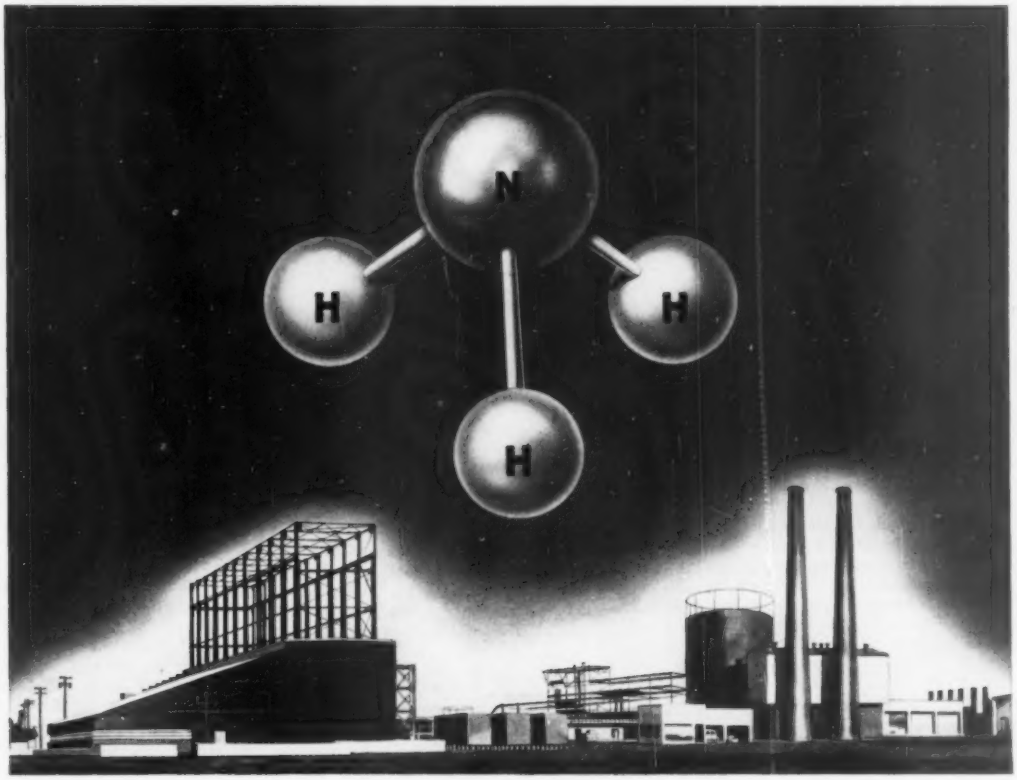
Then came the problem of moving the vessel to location. It was too large for shipment by rail or to go into the hold of a cargo ship. But it would float. So it was lowered by giant-size crane into the Houston ship channel and floated to Brownsville. There it was fished out of the water and skidded to location. A protective covering of timbers to make it safe from damage by bumping, was put on after the vessel was in the water.

The operation was not without complications. An oversized "low-boy" trailer was the only conveyance that would take it from the Wyatt plant to the ship channel. A special moving permit was required from the City of Houston. The trip had to be made after midnight. But the shipping problem was solved, and a second vessel of the same size has since reached destination.

Under way—down the Ship Channel.

Final step—being rolled out of the water and to destination near Brownsville.



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# International News and Notes

## Saudi Government Refinery Plans

## Texas Canadian Contract

## Canadian Extension

## Eastern Distribution

## New Exploration and Production

## Saudi Arabian Production

## European Refineries

## Texas-Arabian Pipe Line Plans

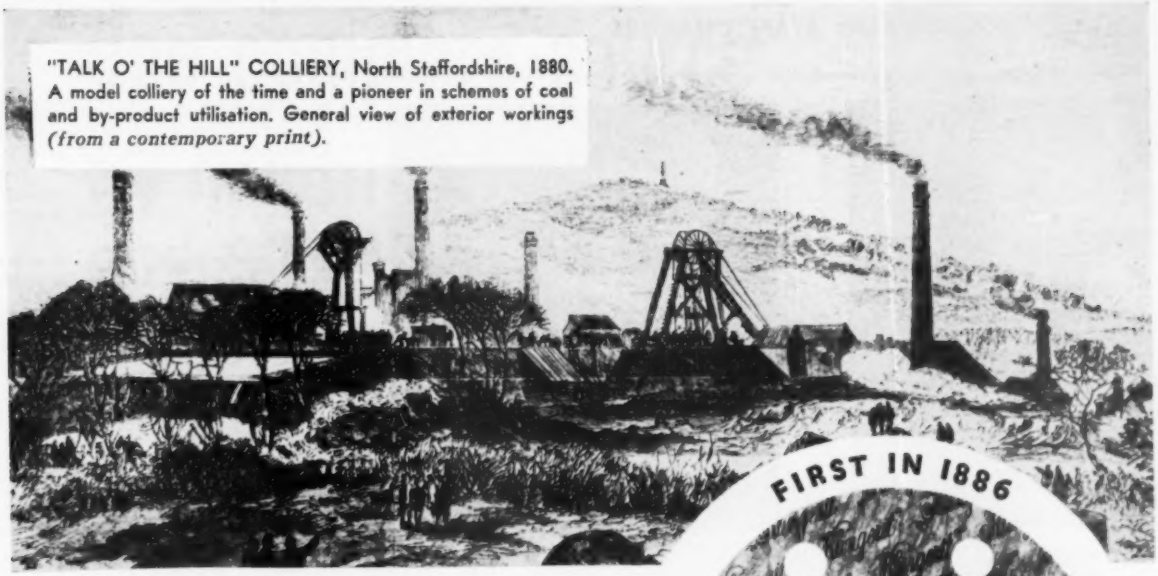
## Foreign Petroleum Companies

## Texas-Arabian Pipe Line Plans

## Honda Forgent Oil Co.

## Fine American Oil Policy

## To Drill in British Columbia



"TALK O' THE HILL" COLLIERY, North Staffordshire, 1880. A model colliery of the time and a pioneer in schemes of coal and by-product utilisation. General view of exterior workings *(from a contemporary print)*.

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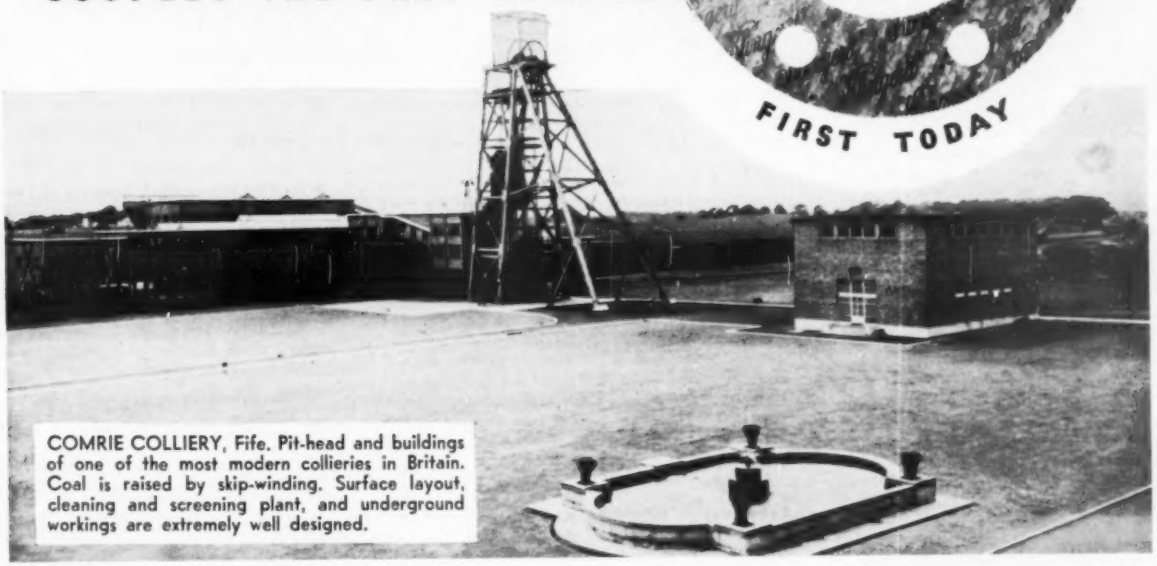

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# International News and Notes

## Brazil Announces Refinery Plans

A statement issued by the National Petroleum Council of Brazil confirms previously published information as to projected refinery construction in that country and provides some additional details. Concerning the large plant which is to be constructed under government auspices, the report states that it will have a crude capacity of 45,000 barrels per day and will produce aviation fuel of 91 octane, motor gasoline of 76 octane, kerosene, diesel oil, fuel oil, commercial liquid propane and various by-products. It will operate on improved crude probably from Venezuela or the Middle East.

The plant will occupy a site of 300 acres and will have storage for a three-months supply of crude and one month's output of products. Thermal cracking equipment will be employed with special units for molecular reforming of the light products to obtain a high yield of gasoline. Contracts have been concluded with Bechtel Corporation to act in a consultative capacity, with Pan American Hydrocarbon Research, a subsidiary of Hydrocarbon Research, Inc., for planning, engineering, purchase and shipment of supplies and supervision of construction, and with the French companies Fives-Lille and Schneider for materials and equipment. The cost of refinery installations is estimated at U. S. $44,335,000, and outlay for the land, housing and utilities will bring the total up to about U. S. $60,000,000.

In addition to the above refinery, a plant is under construction at Metaripe, Bahia, to handle the crude output of wells in that area. This refinery will have a daily crude capacity of 5,000 barrels. It is being built under the engineering direction of the Kellogg Pan-American Corporation.

Government plans include the purchase of tankers with a total capacity of 180,000 tons.

## Bahrein Production

Production of oil in Bahrein during the month of August amounted to 917,866 barrels or at the rate of 29,608 barrels daily.

## New Colombian Law Proposed

In addition to the many bills relating to the exploration and production of oil in Colombia which have been brought before the Congress in the past seven years without resulting in enactment of a new measure, No. 15 on the list has been proposed by Minister of Petroleum Dr. del Hierro. It is designed to simplify the process of establishing title to concessions, but in the opinion of oil men does not correct conditions relating to taxation, depletion and depreciation rates and labor relations which act as a deterrent to investment.

## Belgian Refinery for Jersey Standard

Formation of a company, the Esso Standard Refinery, to construct and operate a modern oil refinery in Antwerp, Belgium, has been announced by Standard Oil Company (N. J.). The refinery will be designed to fill the need for petroleum products of Jersey Standard's affiliates in Belgium, the Netherlands and Luxemburg and will have an output of about 25,000 barrels daily when completed. It is estimated that construction will be finished in about three years. The refinery will manufacture high-grade gasoline, kerosene, fuel oil and automotive and industrial diesel fuel. The company states that the choice of Antwerp follows almost two years of exploratory work to select a site suited to serve consumer needs in the Benelux countries.

## Forms Canadian Company

Hughes Tool Co. has formed a Canadian corporation, Hughes Tool Service Ltd., with headquarters in Calgary, Canada. A group of Hughes sales executives made an extended trip in August to Canada to set up operations, increasing personnel with Canadian citizens. The company is constructing its own main warehouse in Edmonton and will lease rock bits through its authorized distributors patterned after their United States operations, with stocks maintained at strategic points.

Through the policy of leasing Hughes Bits, the field organization of Hughes Tool Service Ltd. will constantly examine worn bits and study drilling problems affecting bit wear and performance. When unusual performance occurs, bits are frequently returned to the research and engineering laboratories in Houston together with field engineering reports for further examinations. Through this method the users of Hughes products and the drilling industry receive the benefits of constant improvement.

H. E. Snelson, a Canadian, formerly Rocky Mountain Division Engineer and well-known throughout Canadian and Rocky Mountain fields, has been made Canadian District Manager. R. T. Helmer continues his duties as Canadian District Sales Representative.

Officers of the Hughes Tool Service Ltd. are: M. E. Montrose, President, Houston; W. L. Hunter, Vice President, Oklahoma City; F. E. Jacobs, Treasurer, Houston; and R. T. Helmer, Secretary, Calgary.

## ECA Aid to European Refineries

The Economic Cooperation Administration in Washington has approved outlays of Marshall plan funds to the extent of $21,420,500 to aid in the rehabilitation and enlargement of five European refineries. Three of the plants to which the appropriation applies are located in France. They are the Port Jerome refinery of Standard Francais des Petroles, the Berre refinery of Cie. de Raffinage Shell and the plant of Socony-Vacuum Francaise at Notre Dame de Gravenchon.

Two British refineries to be aided are those of National Oil Refineries Ltd. at Llandarcy, Wales, and Shell Refinery & Marketing Co. at Shell Haven. Total cost of the French construction is estimated as $44,065,000, including $4,127,500 of ECA funds. The British work will cost an estimated $106,400,000, including $17,293,000 from ECA. Of the total expenditure of $150,465,000 the amount advanced by ECA will be $21,420,500 and the balance of $129,044,500 or 86 percent will be provided by the oil companies.

## Trans-Arabian Pipe Line Filmed

A documentary film of the Trans-Arabian Pipe Line with color and accompanying commentary recently has been completed by Richard Finnie for Bechtel International Corporation, constructors of a large portion of the line. This initial picture, portraying construction of the first unit only, starts with problems of logistics and continues through the building of a base city, the assembling of materials, new methods of pipeline construction and field installation.

## Heads Regent Oil Co.

Regent Oil Company Limited, London, announces that R. Walton Ball has been appointed managing director of Regent Oil Company Limited as from September 1, 1949. Mr. Ball was previously the sales director.

## Canadian Expansion

In connection with its extensive plans for refinery and pipeline construction, Imperial Oil Ltd. estimates that the refining capacity in Alberta will reach 41,550 barrels per day by 1951, and in Manitoba in Saskatchewan, it will amount to 47,400 barrels daily, giving the Prairie provinces a total of 88,950 barrels. Refineries in Ontario, which can be reached by water transportation when the pipeline to Lake Superior is completed, will have a capacity of 84,000 barrels daily, which will make the total available to oil producers in the West 172,950 barrels per day. A highly tentative estimate of probable production in the Prairie Provinces by 1951 is 130,000 barrels daily. Recoverable reserves in Alberta and Saskatchewan are now estimated at upwards of one billion barrels.

## Peru Announces Oil Policy

On Sept. 15 the Peruvian government issued several decrees which it pronounced as the first step in its new oil policy. In a comprehensive statement the government announced its decision to open the country to national and foreign capital, providing "full protection and decisive guarantees" to them and inviting the foreign capital to collaboration in the "most liberal and progressive manner."

A special Direccion de Petroleo was created with Ing. A. Alvarado Garrido, former director general of mines, as first Director de Petroleo. The state-operated Empresa Petrolera Fiscal was dissolved as an autonomous enterprise and reduced to an immediate dependent of the Ministerio de Fomento, conducted by only one manager and subordinated to the Director de Petroleo. The former board was dismissed. At the same time an annual rent of 17 million soles ($2.6 million) was assigned to E.P.F. for acquiring new equipment and improving its exploitation.

By another decree a new commission of three members was named to coordinate and outline within 90 days the final project of the new oil law. The Ministry of Development was authorized to issue permits to any qualified person or company, national or foreign, to execute preliminary exploration studies in the prospective oil regions, but without previously acquiring the right of concessions. Such permits cannot be granted to foreign companies within 50 kilometers of the frontier, under the Peruvian Constitution.

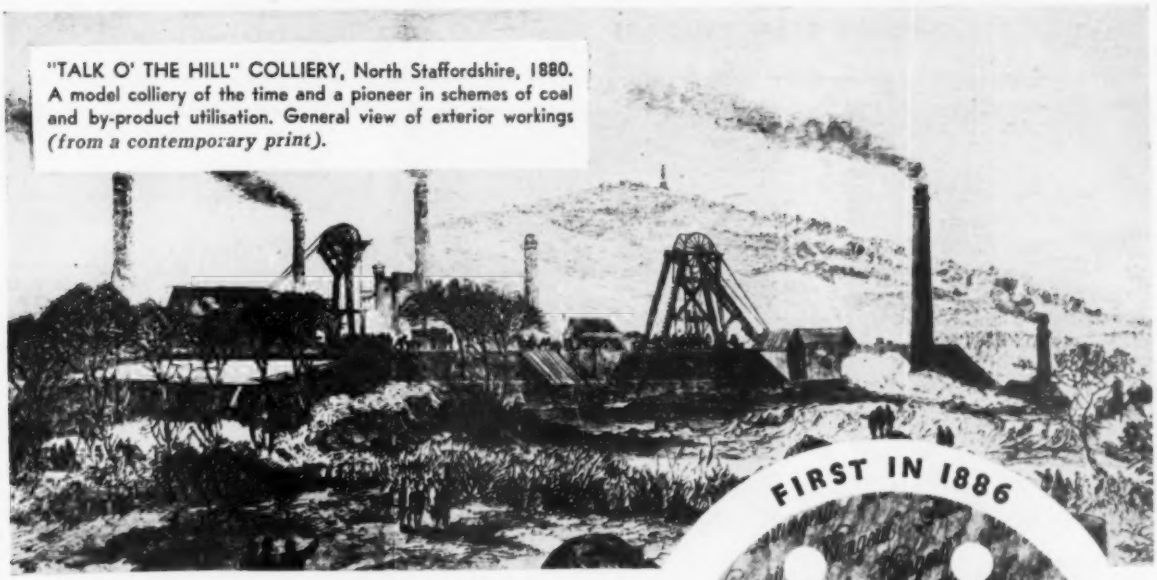
## Saudi Arabian Production

Crude oil production in Saudi Arabia during August amounted to 14,113,731 barrels or an average of 455,282 barrels per day. Crude processed at the company's refinery at Ras Tanura amounted to 4,030,163 barrels or an average of 130,005 barrels per calendar day.

Crude oil production for the first eight months of 1949 amounted to 118,580,554 barrels, an average of 487,986 barrels per calendar day. Crude run in the refinery for the same period was 32,805,742 barrels, an average of 135,003 barrels per calendar day.

## To Drill in British Colombia

A report from Vancouver, British Colombia, states that exploratory drilling is shortly to begin in the Queen Charlotte Islands in that province. The search is to be conducted by Royalite Oil Company, Ltd., under a permit from the provincial government covering 230,000 acres. The existence of seepages in the islands has led to the belief that oil might be found there, but this is the first large-scale exploration to be undertaken.



"TALK O' THE HILL" COLLIERY, North Staffordshire, 1880. A model colliery of the time and a pioneer in schemes of coal and by-product utilisation. General view of exterior workings *(from a contemporary print)*.

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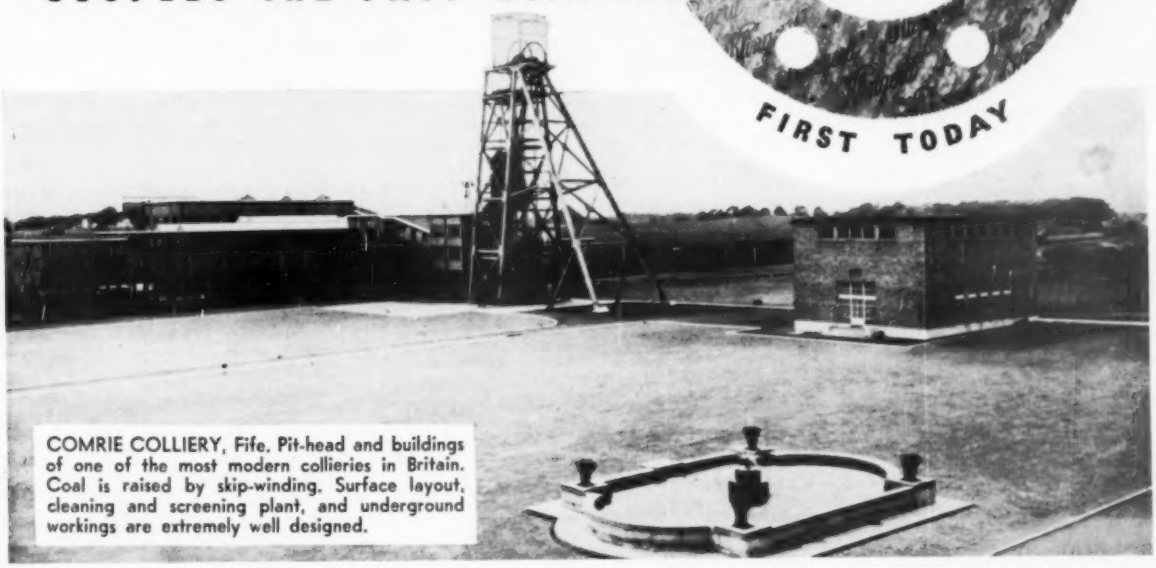

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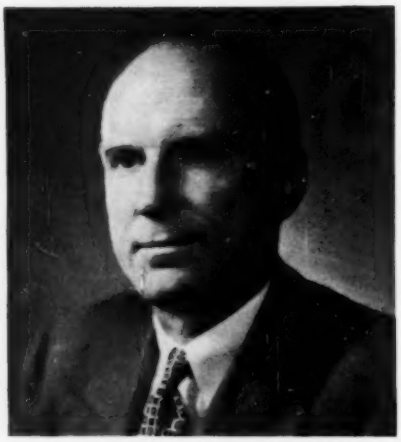
## OIL COMPANY STAFF CHANGES



Howard B. Nichols

Paul A. Best

**HOWARD B. NICHOLS** has been elected a director, a vice president and a member of the executive committee of California Texas Oil Co., Ltd., and a director of The Bahrein Petroleum Co., Ltd., of which he is now a vice president and a member of the executive committee. In these new offices he succeeds the late D. J. Hanna, who died July 26th last.

Mr. Nichols has been with the Caltex-Bahrein group of companies since January 1938, and had previously assisted in the design of the Bahrein refinery, Persian Gulf, which began construction in 1936. He has been engaged in petroleum refining since 1923, immediately after his graduation from Stanford University with a degree in engineering. Mr. Nichols spent a total of 14 years at Standard Oil Co. of California refineries. He specialized in cracking processes, and for seven years was in charge of all plant and laboratory research and development work on cracking and related refining processes. He became manager of research and development for Bahrein in January 1938, and was elected assistant vice president in 1944, becoming vice president in charge of refining in January 1947. Later that same year, he was elected assistant vice president in charge of refining of California Texas Oil Co., Ltd.

**PAUL M. ISBILL** has been appointed assistant general manager (administration) of The Texas Company's domestic sales department, according to an announcement by R. L. Saunders, vice president. S. C. Bartlett has been named assistant general manager (sales), succeeding the late D. D. Monroe. Mr. Isbill's duties will be taken over by H. W. Holland, former superintendent, equipment division, who becomes manager of operations. Mr. Bartlett, formerly sales manager of Texaco's central territory, moves his headquarters from Chicago to New York.

**DR. J. M. HANSELL** has been appointed geologist for the Canadian division of Sun Oil Company's production department at Calgary, Alberta. Dr. Hansell joined Sun 15 years ago and worked in several districts in the southwest before moving from Corpus Christi to Dallas last year to become regional geologist for the area east of the Mississippi River.

**W. M. GRIFFITH** has been named district manager of the southern area, Pacific Coast territory, of the Superior engine division of The National Supply Co. His offices will be at the Torrance, Calif., plant. National also operates a sales office at Portland, Oregon, with Louis R. Shults in charge.

**PAUL A. BEST** has been named assistant to the president of The California Oil Co., a wholly-owned subsidiary of the Standard Oil Co. of Calif., which markets petroleum products along the Atlantic seaboard and in other states east of the Rocky Mountains. Mr. Best during the war first served as assistant director of marketing for the PAW and later as a Naval officer handling petroleum transportation and supply problems in Washington, the Mediterranean and the Pacific Ocean areas. Prior to the war he worked for The Texas Co. and the California-Texas Oil Co. Ltd. When with Caltex (India) Ltd., he was assistant district sales manager in Bombay.

**JOE MILLER** formerly assistant gas superintendent for Humble Oil & Refining Company, has been appointed to a newly-created position as coordinator of supply and sales of light hydrocarbons. The new job was set up to coordinate supply, distribution and sales of increasing quantities of propane, butane and other light hydrocarbons being produced by the company's refinery and by natural gasoline and gas cycling plants over a wide area.

**COL. LUKE W. FINLAY** of the law department of Standard Oil Co. (N.J.) has been ordered to active duty in the Army for a period of six months. He will serve as executive officer of the Civilian Components Policy Board of the Department of Defense in Washington. The board was recently established to promulgate and coordinate plans and policies of the reserve components of the armed forces.

**GREGORY H. HEBERT** has joined the technical staff, Paramins division of Enjay Company, Inc. He was formerly with the Standard Oil Development Company engaged in research and field testing of lubricants and fuels. A graduate in civil engineering of the University of Illinois, Mr. Hebert served as Lieutenant Commander with the United States Navy during the war as special instructor on aircraft engines at the Massachusetts Institute of Technology, and flight-test senior project engineer at the Naval Air Test Center at Patuxent River, Maryland. Prior to his military service, he was with the Carter Oil Company from 1938 to 1942.

**R. L. ALEXANDER** has been appointed manager of operations of the Marketing Department of Sinclair Refining Co. He has been staff assistant to the general sales manager since 1929.

**W. C. MacMILLAN** was elected executive vice president of Continental Oil Co. at a meeting of the board of directors in New York City. Serge B. Jurenev, secretary of the company, was elected vice president in charge of coordinating and planning. Rawleigh Warner, Jr., will succeed Jurenev as secretary.

Mr. MacMillan, formerly vice president and administrative assistant to the president, has been with Continental for more than 20 years. He was vice president in charge of production for several years. Mr. Jurenev was with J. P. Morgan and Co. Inc., for 16 years. He joined Continental Oil Co. in February, 1942. Mr. Warner, formerly assistant to the treasurer of Continental Oil Co., was partner in a Chicago investment firm when he joined Continental in July, 1948.

**R. F. BAITY,** general manager of sales and a director of Standard Oil Co. (Ind.), will become vice president in charge of sales on October 15. He succeeds Roy F. McConnell who will retire after nearly 43 years with the company. Dwight F. Benton, formerly president of Root Petroleum Co. of Shreveport, La., will succeed Mr. Baity as general manager of sales and will become a director of Standard Oil Co. (Ind.) Mr. Benton was general manager of the lubricating and sales technical service departments of Standard before becoming president of Root.

**W. R. HUBER** has been appointed general manager of retail marketing for Gulf Oil Corp. in a general domestic marketing reorganization. Mr. Huber, formerly manager of advertising and sales promotion, will head sales for the primarily retail farm, airport, service station, home heating and marine markets.

D. P. Clark was named general manager of direct marketing. Mr. Clark, formerly assistant general manager of lubricating sales, is in charge of the primarily direct-to-consumer commercial, contractor, industrial, fleet and transportation markets.

W. E. Dermody, formerly manager of specialty sales, will head the advertising department with responsibility for all advertising in support of sales and company goodwill. C. E. Skinner becomes commercial research manager, and G. T. Ryan, operations manager. Named to serve as assistant general managers for specific retail markets under Mr. Huber are: M. C. Enright, farm market; H. E. Benson, service station market; C. E. Kramb, home heating market; W. B. Lenkard, aviation market; and J. M. Torrance, marine market.

W. R. Huber

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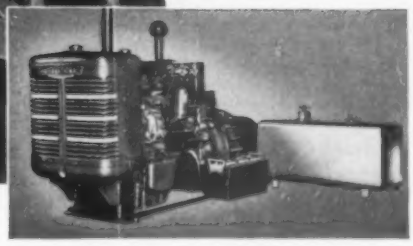

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# INTERNATIONAL INDUSTRIAL POWER

Hugh M. Thralls

## Thralls Elected Vice President of SSC

Hugh M. Thralls has been elected a vice president of Seismograph Service Corp. Mr. Thralls joined SSC in 1936 as party chief of a crew located at that time in Illinois. He was named chief geophysicist for SSC in 1945 and the following year was elected a director.

L. C. Cornish, an SSC employee for almost 18 years, has recently been placed in charge of the company's Midland, Texas, office. Mr. Cornish has had experience in geophysical exploration throughout the mid-continent area and in Romania.

Resignations of T. A. Manhart and of George W. Reed as directors of the corporation have been accepted. Both had previously resigned as officers and employees of the corporation and its subsidiaries but had continued as directors.

## Grant Oil Tool Buys MacClatchie

Henry Salvatori, president of Western Geophysical Co. and Grant Oil Tool Co., has announced that he and his associates bought MacClatchie Manufacturing Co., Los Angeles, effective Sept. 1. MacClatchie Products will further round out the wide range of oil field equipment and services now available through Grant Oil Tool Co. and Western Geophysical Co. Distribution will be maintained throughout major oil territories as in the past.

## Westinghouse Sales Promotion Manager

Appointment of Luis G. Nunez, a 30-year Westinghouse veteran, as manager of the sales promotion and advertising department of the Westinghouse Electric International Company was announced recently by William E. Knox, president. Mr. Nunez succeeds Fred Fleischman, Jr., who has resigned but who will remain as a consultant to the department for the next few months. John V. Deacon has been named assistant manager of the department, replacing Mr. Nunez in that post. A native of Cuba, Mr. Nunez joined Westinghouse in 1919 and has held successive posts as translator, regional supervisor, editor of company publications and assistant manager of the advertising and sales promotion departments.

## IDECO Appointment

Kenneth L. Mills has been appointed product manager of oil field sales, Columbus divison, International Derrick & Equipment Company. In his new position Mr. Mills will correlate the work of the Columbus division's engineering, production and quality control departments and give technical assistance to the company's oil field sales divisions.

He is a graduate of Rice Institute and has seen service in engineering and managerial positions with American Manufacturing Company of Texas, Bethlehem Supply Company, Texasteel Manufacturing Company and Emsco Derrick & Equipment Company.

## ELI Personnel Changes

William G. Green, president and general manager of Engineering Laboratories, Inc., Tulsa, has announced the following administrative appointments:

R. H. Hinkson has been named sales manager of the company. He formerly was sales engineer covering the eastern half of the country. Prior to entering military service in 1942 he was vice president and general manager of Hinkson Service, Inc., dealing in steel construction and electrical engineering.

Kenneth R. Kennedy has assumed the position of manager of the ELI plant at Garland, Texas, where drilling bits and drilling equipment are manufactured. He is a member of the American Society of Tool Engineering.

B. M. Baker, now engineering manager, came to the company in 1941 as an engineer. From 1942 to 1945 he served with the Air Corps and Army Air Forces. Following the war he returned to ELI as chief mechanical engineer and held that position until his recent appointment.

**HENRY J. COLEMAN** has been appointed advertising manager of The Standard Oil Co. (Ohio). He succeeds John H. Wieland, who has been promoted to chief of the merchandising staff for Sohio.

**ROGER W. LEASON,** vice-president and treasurer of the Emsco Derrick & Equipment Company, has been elected president of the Los Angeles Control of the Controllers Institute of America. New president of the Institute's Dallas Control is Ralph W. Rager, vice-president of the Oil Well Supply Co., that city. Dee Davis, secretary and treasurer of The California Co., New Orleans, and Wilson K. Minor, assistant controller of the Standard Oil Co. of California, San Francisco, have been elected vice presidents of the local controllers' group in their respective cities.

Alexander Fraser

**E. W. LUSTER** has been named manager of the Esso engineering department of Standard Oil Development Company, central research affiliate of Standard Oil Co. (N. J.) He succeeds Dr. N. E. Loomis who retains his position as vice president of the Development Company while relinquishing his duties as department manager in order to devote more attention to general policy matters. C. E. Paules, formerly associate chief engineer, succeeds Mr. Luster as chief engineer with responsibility for the general supervision of the department.

## Manager of Houdry Catalyst Plant

Brigadier General D. N. Hauseman, president of Houdry Process Corporation, has announced the appointment of Raymond B. Cross to the position of manager of the corporation's Paulsboro catalyst plant. Mr. Cross has been with the Houdry Corporation for 13 years. He went to Paulsboro as chief chemist when the plant went into operation in 1940. He succeeds A. R. Worrall, who is leaving Houdry to accept a position with the Davison Chemical Corporation.

## Shell Consolidates Companies

To complete a process of corporate simplification which has been in progress for several years, Shell Union Oil Corporation on September 30 acquired the assets of its wholly-owned operating subsidiary, Shell Oil Company, Inc., which is being liquidated. No action by Shell Union stockholders is required except to vote on the change of name from Shell Union Oil Corporation to Shell Oil Company. No exchange of securities is involved nor any change in Stock Exchange listings except changing the name of the company from Shell Union Oil Corporation to Shell Oil Company. When share certificates pass through the hands of transfer agents, the new certificates will bear the revised name.

The wholly-owned Shell Pipe Line Corporation and Shell Chemical Corporation are not involved in the corporate consolidation under consideration.

According to announcement of Alexander Fraser, president of Shell Union, the staff organizational planning which has been in progress since the end of the war has already achieved such results in streamlining the organization from top to bottom that the consolidation proposed will call for no staff changes at the operating level and no material change in the official positions of the senior managerial staff. George Legh-Jones will continue as chairman of the board; the chairman of the executive committee will be Alexander Fraser, and the office of president will be filled by H. S. M Burns, who has been president of the operating company. Vice presidents of the two companies will retain their title and position in the newly-named Shell Oil Company.

H. S. M. Burns

## New Exploration Organization

A new exploration contracting company, Petrolem Consultants, Inc., has been organized with headquarters in Tulsa, Oklahoma. This company will offer to the oil industry geological and seismic services on a contract basis and is intended particularly to serve companies which have limited or no geological or geophysical departments, or those larger companies which have interests in districts where they have no organization.

At the first directors' meeting T. A. Manhart was elected president; Carl W. Blakey, vice president; J. L. Friendly, vice president, and Fred W. McMahon, secretary treasurer. Mr. Manhart, former executive vice president of Seismograph Service Corporation, has been in the geophysical contracting business in Tulsa since 1933 and previously was associated with the teaching staff at the Colorado School of Mines in Golden, Colorado. In his professional work he has had broad experience in all parts of the oil-producing world.

Clark Millison, consulting geologist of Tulsa, will serve Petroleum Consultants, Inc., as geological consultant. Carl W. Blakey, former Rocky Mountain district manager for Seismograph Service Corporation, will assume active charge of field operations. He has been engaged in seismic operations since 1943 and has extensive experience in all parts of the United States as well as operations in the Middle East in Egypt, Iran, Iraq and Palestine.

J. L. Friendly, former director of the manufacturing plant of Seismograph Service Corporation, will be in charge of all equipment and instruments operated by Petroleum Consultants, Inc. Mr. Friendly has been engaged in geophysical work since 1936 and has built equipment for operations in many parts of the world. Fred W. McMahon, formerly associated with Deep Rock Oil Company and the Sloan & Zook Companies, will be in charge of the administrative and accounting work for the new organization.

## Barnsdall Plans Expansion

Floyd B. Odlum, chairman, and William Dewey Loucks, president, of Barnsdall Oil Company, have confirmed the report of a pending merger between Barnsdall and Ogden Corporation, the resulting company to be known as Barnsdall Oil Company with the same directors and officers as the present company.

The proposal is that the holder of each share of common stock of Barnsdall Oil Company will have the right to receive one share of common of the merged company with the right for a limited period to convert such share into $55 par value of five percent cumulative preferred stock of the new company resulting from the merger. Ogden Corporation shareholders will receive fractional shares yet to be determined.

To provide funds for oil and gas exploration and development and for general corporate purposes, a loan of $40,000,000 has been negotiated with the Prudential Insurance Company of America and a group of banks. This loan is to run for 13 years with $3,000,000 fixed prepayment each year prior to maturity. The maturities for the first five years are to be taken by the banks and the remaining $25,000,000 by Prudential.

## German Refinery Omitted from List

As a result of oversight the Deutsche Shell refinery at Mannheim, Germany, was not included in the list of oil refineries of the world published in the Annual Refinery Issue of WORLD PETROLEUM. This plant has a throughput capacity of about 3,300 barrels daily and produces gasoline, diesel fuel, lubes, asphalt and coke.

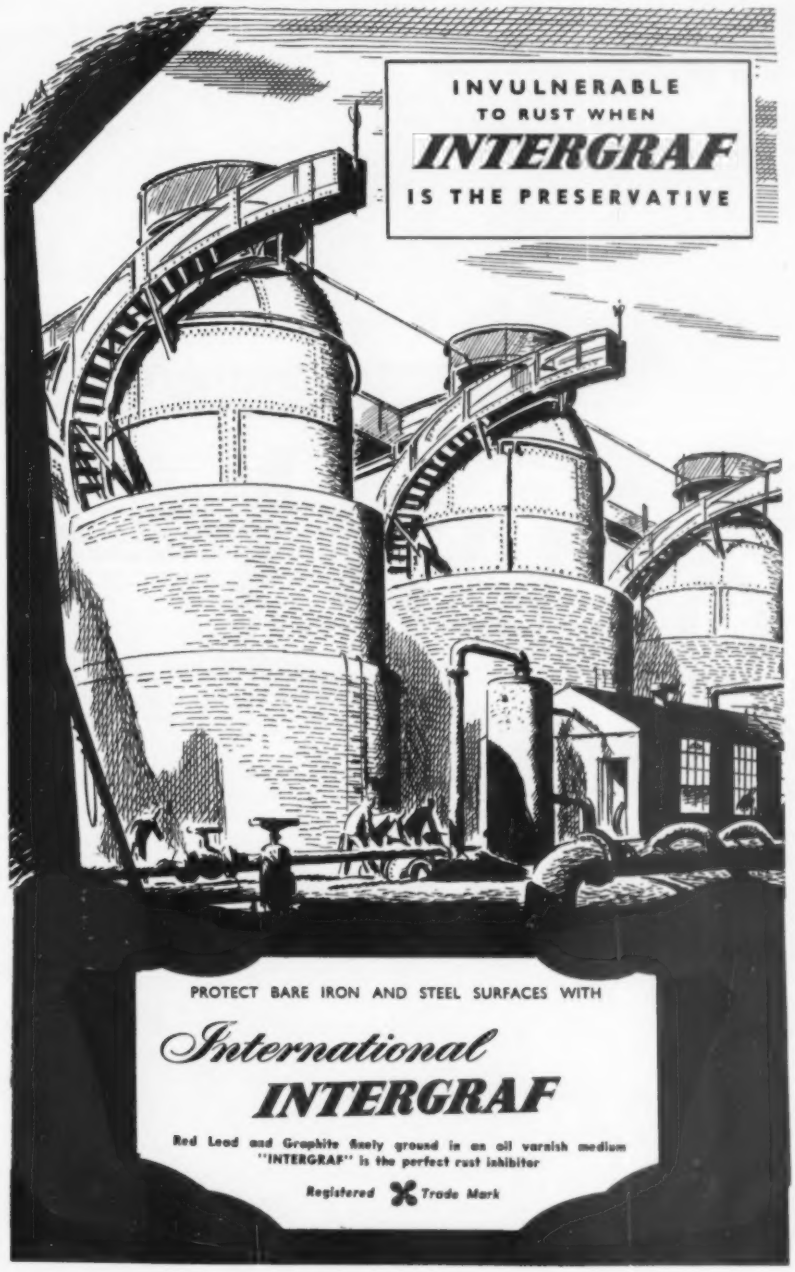
## Synthetic Products Not Competitive

A report by George Roberts Jr., manager of Stanolind Oil and Gas Company's research laboratory, and Paul R. Schultz, manager of the company's economics department, states that liquid fuels from coal or oil shale cannot now compete economically with the fuels derived from crude petroleum. Their comparisons show that manufacturing costs of producing a gallon of gasoline from oil shale or bituminous coal under present conditions would be approximately 80 percent higher than that made from crude oil. Gasoline from subbituminous coal would cost about 125 percent more than gasoline from crude. Their figures included investment charges and costs of mining, manufacturing and transportation.

## Deepest Producing Well

World's deepest producing well is reported from California. It is located in the Wasco field in Kern County, was drilled by Standard Oil Company of California and is producing from sand of Eocene age at a depth of 15,440 to 15,475 feet. On initial test through a one-inch choke, the well produced at the rate of 96 barrels per day.

Formerly the deepest producing well was Pure Oil Company's West Poison Spider 1, Natroma County, Wyoming, with a depth of 14,307 feet. The record for drilling depth is held by Superior Oil Company's Pacific Creek 1 in Sublette County, Wyoming, which was completed at 20,521 feet as a dry hole.

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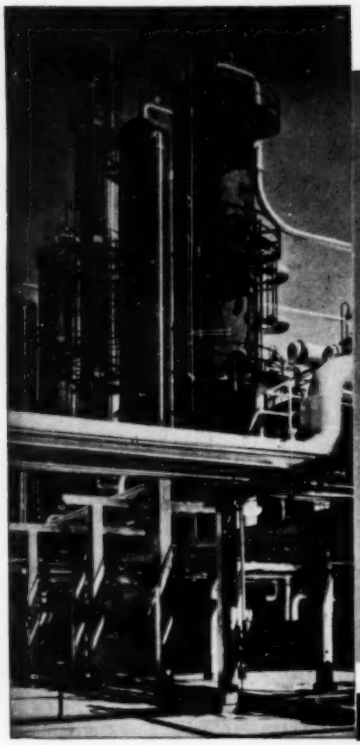

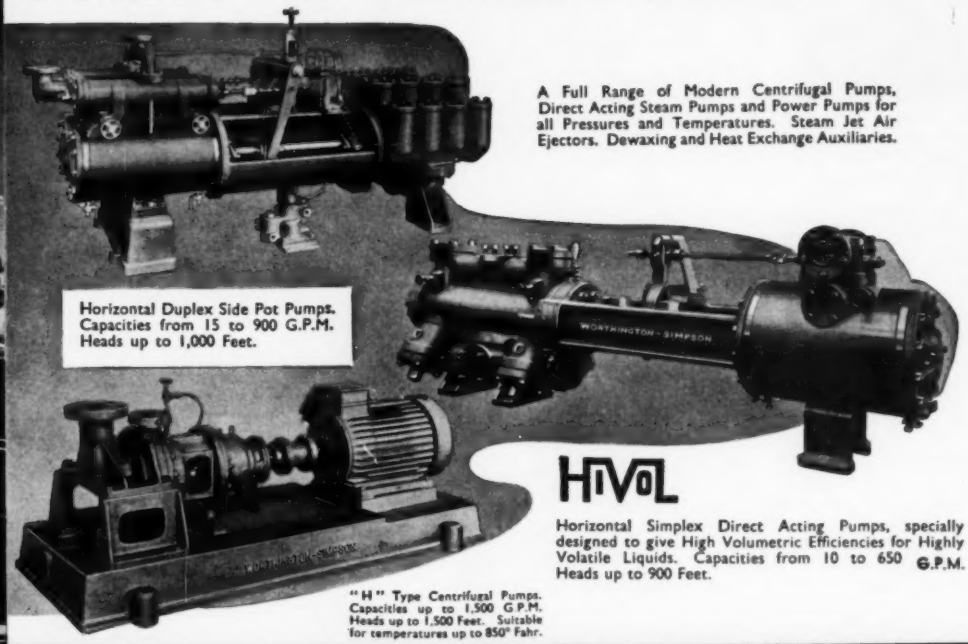

A Full Range of Modern Centrifugal Pumps, Direct Acting Steam Pumps and Power Pumps for all Pressures and Temperatures. Steam Jet Air Ejectors. Dewaxing and Heat Exchange Auxiliaries.

Horizontal Duplex Side Pot Pumps. Capacities from 15 to 900 G.P.M. Heads up to 1,000 Feet.

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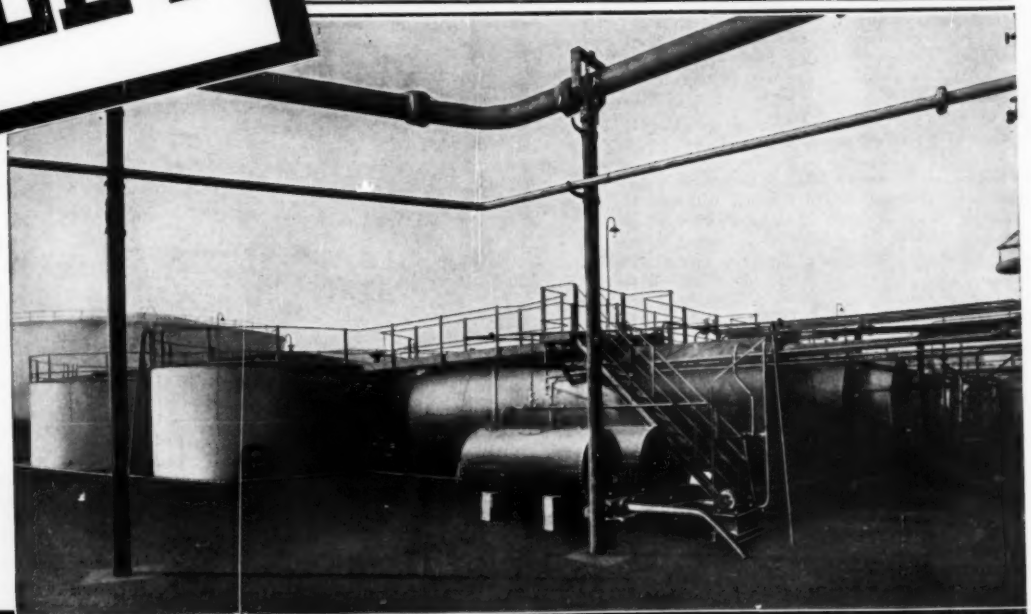
# OXLEY

## WELDED STORAGE TANKS



Part of a battery of ten, electrically-welded steel storage tanks 9'x0" dia. x 30'0" long with tank in background 25'0" dia.. x 10'0" deep. Erected at Ellesmere Port, Cheshire. (Photograph by courtesy of Lobitos Oilfields Ltd.)

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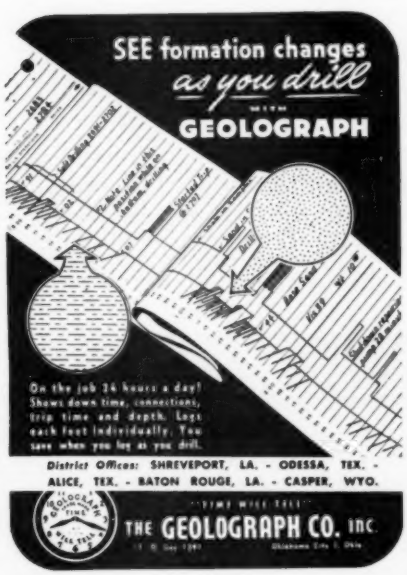
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On the job 24 hours a day! Shows down time, connections, trip time and depth. Logs each foot individually. You save when you log as you drill.
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## Export Orders for Dresser

Export orders of Dresser Industries, Inc., Cleveland, Ohio, makers of oil and gas producing equipment, from the Argentine, Turkey, Yugoslavia and Italy that will total at least $7 million and may run as high as $10 million, have been announced by J. B. O'Connor, executive vice president.

"These sales, consisting chiefly of equipment to increase the availability of petroleum products and natural gas," Mr. O'Connor said, "reflect the effort now being made by nations all over the world to bring to their own people more of the benefits of their own natural resources."

Sales to the Argentine were made possible, Mr. O'Connor explained, by the conclusion of a three-way arrangement whereby Argentine wools, hides and tanning extracts sold to Europe provide the means of payment. Dresser products sold to the Argentine include equipment both for the drilling of new wells and the rehabilitation of existing wells, adapted to the special conditions in the Argentine fields. Among Dresser companies participating in this business are Clark Bros. Co., Inc., supplying compressors and pumps; International Derrick & Equipment Co., supplying drilling rigs and rotary oil field equipment; Pacific Pumps, Inc., supplying hundreds of pumps for rehabilitation of present wells; and Security Engineering Co., Inc., supplying drilling bits. Dresser companies are also furnishing pumps and gas compressor equipment for new Argentine refineries; and Roots-Connersville Blower Corp., another Dresser company, is installing positive gas boosters to improve the gas supply of the city of Buenos Aires.

Turkey, Mr. O'Connor reported, is rapidly becoming an important oil-producing country. Dresser has already completed shipment of several drilling rigs to the Adana Basin and is shipping producing equipment to the new Raman dag field, which shows the same geological trend as the Mosul field in Iraq and bids fair to be one of the largest oil strikes in recent years.

In Italy a Dresser gas-pumping equipment unit on display at the Padova Fair, plus several additional units, were bought by Italy for installation in the Po Valley to help supply natural gas to Italian industries. There are indications, Mr. O'Connor said, that deeper drilling may tap a new large natural gas reserve and thereby make unnecessary the importation of coal.

The Yugoslavia program includes both the rehabilitation of old wells and deeper drilling to promising new levels. Dresser is furnishing modern portable equipment designed to speed operations.

## Tanker Launching

The S. S. "Sovac Aladdin," built for Tankers Navigation Co., Inc., was launched September 12 by Sun Shipbuilding and Dry Dock Company. Mrs. Roy W. Chamberlain, wife of the president of Tankers Navigation Company, was the sponsor. The "Sovac Aladdin" is one of the super tankers being turned out by Sun Shipyard. She is more than 600 feet long with a beam of 82½ feet and a depth of 42½ feet. Her cargo carrying capacity is 230,997 barrels of oil.

## New Tanker for Asiatic

World Liberty, fifth of the 28,000-ton tankers being built by Bethlehem Steel Company at its Quincy, Mass., yard for World Tankers, Inc., was launched on August 24. The vessel is of 625-foot length, 33-foot draft and has a liquid cargo capacity of 240,000 barrels. Its propulsive power consists of Foster Wheeler water tube boilers generating steam at 600 psi to drive Bethlehem turbines delivering 13,760 shaft horsepower through Falk reduction gears.

The tanker will be operated by North American Shipping and Trading Co., Inc., and will go on long-term charter to Asiatic Petroleum Company for international service.

## Orders Placed for Houdry Units

The major construction program adopted by California Refining Company for its Perth Amboy, New Jersey, plant will include a 25,000-barrel-per-day Houdriflow catalytic cracking unit, it was disclosed last month by Brigadier General D. N. Hauseman, president of Houdry Process Corporation. The new unit will be the first catalytic cracking installation for the California company and will be the seventy-seventh Houdry-licensed catalytic cracking unit. Other additions to the refinery will be in large crude distillation unit, polymer and gas treating units.

A Houdriflow catalytic cracking unit also is to be installed in the Salt Lake City, Utah, refinery of Standard Oil Company of California. T. Ellwood Webster, president of The Catalytic Construction Company of Philadelphia, states that work started on September 6 on a catalyst change at the Houdry unit of Standard Oil Company (Ohio) at its main refinery in Cleveland, Ohio. This operation is the third Houdry case turnaround Catalytic has performed for Sohio in Cleveland.


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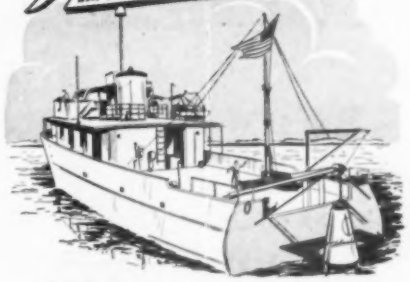

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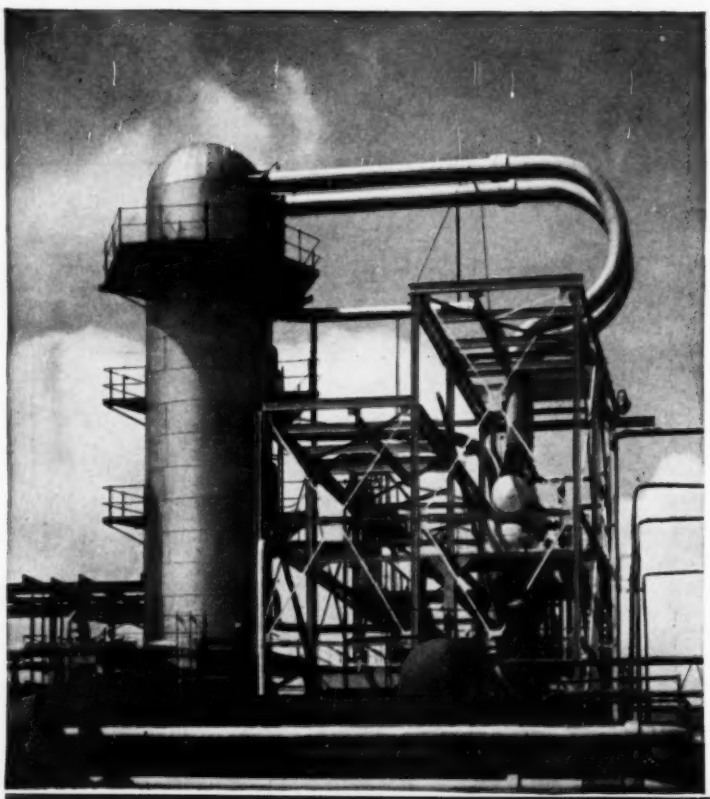

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## Graver Water Conditioning Co. Moves

Graver Water Conditioning Co. announces the removal of its general offices to larger quarters at 216 West 14 Street, New York 11, N. Y. The company is a division of Graver Tank & Mfg. Co. Inc. which has manufactured and erected equipment for all water treatment and liquid conditioning processes for 40 years. The new location houses expanded sales and engineering offices, a complete chemical laboratory and an extensive pilot plant.

## Emsco Engineering Conference

A meeting of the key engineering personnel of Emsco Derrick & Equipment Company was held recently at the company's Los Angeles plant. Both design and field engineers attended the meeting, representing the Emsco Los Angeles plant, the Emsco-Houston plant and the Dallas office of The Continental Supply Co. Engineering conferences are held periodically in both the Mid-Continent and California areas for the purpose of reviewing new trends in drilling and producing field operations.

## Erratum

In the annual refinery review issue of WORLD PETROLEUM, the listing of oil refineries in Germany failed to contain data regarding the lube plant operated by Mineraloelwerke Albrecht & Co., in the British Zone at Hamburg-Grasbrook. This firm operates a lubricating oil plant with a capacity of 850 barrels daily.

## New International Harvester Engine

A new four-cylinder gasoline engine, the International model U-1, that will fit a wide range of "few" horsepower applications has been announced by Industrial Power sales of the International Harvester Export Co. Addition of the 16-horsepower U-1 expands the International line of carbureted engines to five, ranging up to 55 rated horsepower.

## Opens New Store

Mid-Continent Supply Co. has opened a new field store in the Scurry County area at Snyder, Texas. The opening was celebrated Aug. 26 with an open house and barbecue. Ken W. Davis, president and general manager, estimated that around 1,800 guests partook of Mid-Continent hospitality.

## Corrosion Control

A review of methods employed in the oil refining industry to control corrosion due to sour crude and other causes is contained in the current issue of The Kellogram. The Kellogram is the house magazine of The M. W. Kellogg Co., refinery engineers and contractors. The issue states that industry in the United States has a cost of about $6 billion for equipment ruined by corrosion.

## J. Elmer Thomas Dies

J. Elmer Thomas, widely known petroleum consultant, died at his home in Fort Worth, Texas, on Aug. 20 of a heart attack, shortly following his return from Italy where he had acted in an advisory capacity for American and Italian interests. During the late war Mr. Thomas served as special assistant to the deputy administrator of PAW.

## School of Mines Anniversary

Seventy-fifth anniversary of the founding of the Colorado School of Mines at Golden, Colorado, was celebrated by a three-day meeting from Sept. 29 to Oct. 1. In addition to the convocation ceremonies attended by distinguished guests, a series of conferences dealt with special subjects including sessions on geology, geophysics, petroleum production, refining and research. At the anniversary banquet held in Denver, Max W. Ball, petroleum consultant, was toastmaster, and the principal address was delivered by Secretary of the Interior Krug.

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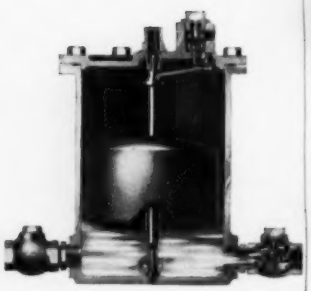

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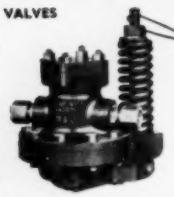

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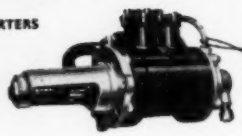

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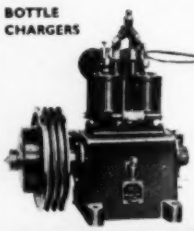

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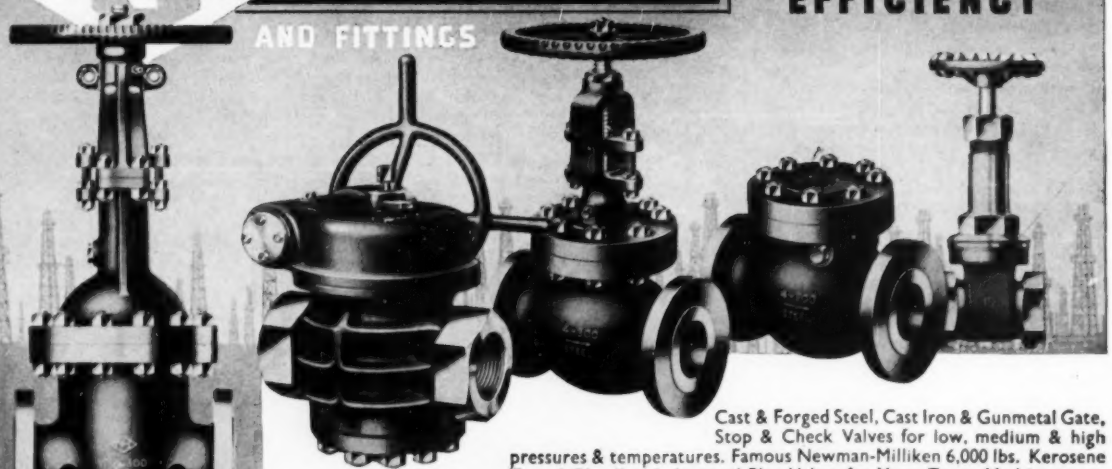

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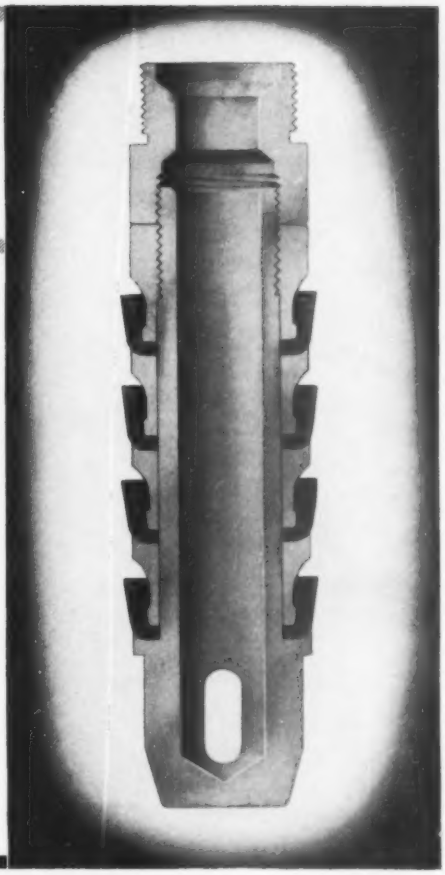

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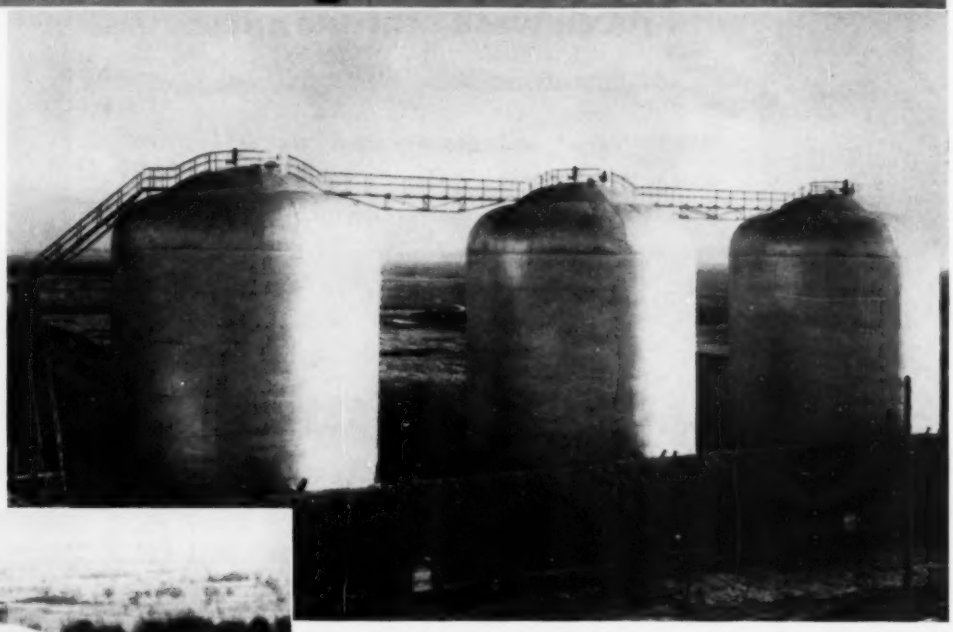
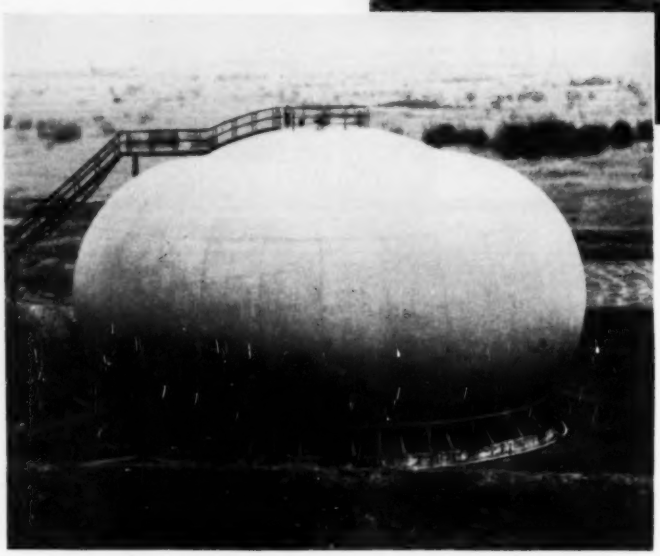
# Pressure Storage in FRANCE





*The three 15,000-bbl. Hemispheroids shown at the right above were erected for Cie Francaise de Raffinage at its refinery at Gonfreville-L'Orcher in Normandy by our licensee, Constructions Metalliques de Provence. The 30,000-bbl. Hortonspheroid shown directly above is at the same location.*

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